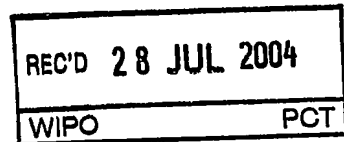
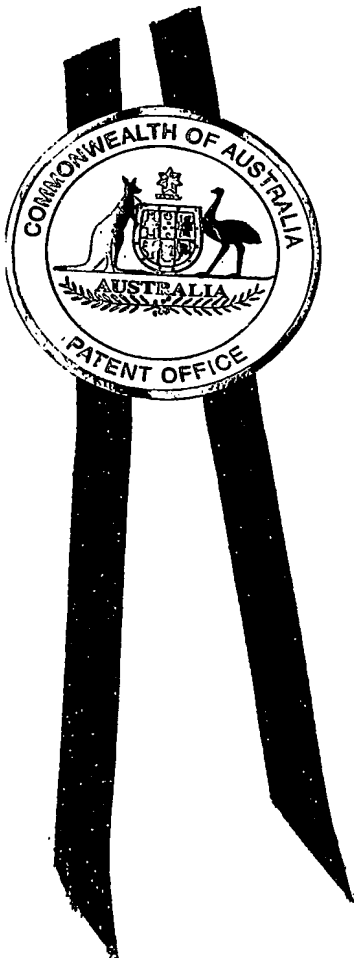




Patent Office
Canberra



I, JULIE BILLINGSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2003904266 for a patent by YARRA RIDGE PTY LTD as filed on 11 August 2003.



WITNESS my hand this
Fourteenth day of July 2004

A handwritten signature in cursive script that reads 'J. Billingsley'.

JULIE BILLINGSLEY
TEAM LEADER EXAMINATION
SUPPORT AND SALES

**PRIORITY
DOCUMENT**

SUBMITTED OR TRANSMITTED IN
COMPLIANCE WITH RULE 17.1(a) OR (b)

Field of the Invention

This invention relates to locks for displaceable wings, said wings including French Doors, Security Doors and Timber Doors including hinged and sliding doors.

Background to the Inventions

5 French doors, as defined below, require rods that can be driven out against not insignificant resistance because they typically have a strip of compressible sealing material located between the door and the edge against which it closes (this strip being to prevent energy loss). These doors lend themselves to being urged fully closed by the operation of remote locks having a plunger-like member that is driven
10 out into the aperture of a receiving member, wherein as the bolt slides down the aperture, the door is forced to fully closed.

French doors often require a lock to have a lock body of small depth that typically is not more than 40MM, a small setback that typically is 30MM, a small width that typically is 17 MM, a bolt that can extend typically 16 MM from the lock body and
15 rods that displace typically 15 MM. Preferably, an industry standard for the distance between the cylinder and lever axis of 85.00 MM should also be observed. Security doors often require a lock to have a lock body of small depth that typically is not more than 40MM, a small setback that typically is 27MM, a small width that typically is 14.5 MM, a bolt that can extend typically 13 MM from the lock body and rods that displace
20 typically 11 MM. Preferably, the lock should also comply with the industry standard fitting apertures within the door. These space requirements, are difficult to comply with because the bolt needs to extend adequately into the casing when fully extended to be properly supported and this imposes restrictions on integers competing for space adjacent the bolt and because the lock body must fit within an
25 extrusion this places restrictions on the bolt, casing and other components that also must observe minimum strength requirements so that the lock can comply with Australian standards.

Locks commonly employed in French doors in Australia, do not provide compression, they are lockable only by key and it is not possible to lock the exterior
30 lever while the interior is free to operate to enable egress and in some applications this is inconvenient and unsafe. Locks commonly employed in security doors in Australia do have locking by locking lever (snib-lever) but do not provide for locking of the exterior lever while retaining the interior lever free to be operated to enable egress.

35 The inventions herein, include locks that address the inadequacies of locks commonly employed in French doors and security doors.

The inventions herein, comprise improved complete locks and improvements for locks for displaceable wings that are not just limited to addressing the inadequacies of Security and French doors

Summary of the Invention

5 According to the invention, there is a lock including a casing with sides, a bolt supported in the casing to be displaceable between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,

an angularly displaceable driver operably connectable to an upper remote
10 engaging member by an upper vertically elongated drive member and/or connectable to a lower remote engaging member by a lower vertically elongated drive member,

at least one hand operable angularly displaceable lever having a free end and at least one angularly displaceable unlatching cam to operably connect the bolt and driver to the at least one lever,

15 wherein the bolt is displaceable towards the casing by downward displacement of the free end and each connected drive member is displaceable towards and away from the casing by displacement of the free end.

In forms of the invention, the pivotal axis of the driver intersects through the unlatching cam.

20 In forms of the invention, the driver comprises a substantially annular member supported within a substantially circular recess.

According to the invention, there is a lock including a casing with sides, a bolt supported in the casing to be displaceable between a fully extended position where
25 the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,

operating means by which to displace the bolt towards the retracted position including an exterior and an interior hand operable lever operably connected to the bolt by angularly displaceable means,

30 deadlocking means by which to restrain the bolt in the fully extended position including an adapted deadlocking slide or an adapted locking slide and a hand operable locking member that is operable to displace the said adapted deadlocking slide or an adapted locking slide, said adapted deadlocking slide or an adapted locking slide being displaceable by the locking member to a third locked configuration
35 corresponding to the exterior lever being locked to be restrained against displacement,

said adapted deadlocking slide or an adapted locking slide being displaceable from the third locked configuration to unlock the exterior lever by displacement of the unlatching rocker caused by displacement of either lever.

5 In forms of the invention, the angularly displaceable means comprises an angularly displaceable unlatching rocker

According to the invention, there is a lock including a casing with sides, a bolt supported in the casing to be displaceable between a fully extended position where
10 the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,

an angularly displaceable driver operably connectable to an upper remote engaging member by an upper vertically elongated drive member and/or connectable to a lower remote engaging member by a lower vertically elongated drive member,
15 deadlocking means by which to restrain the bolt in the fully extended position including a key operable cylinder and a deadlocking slide that is connected by a deadlocking slide extension to the driver,

said deadlocking slide being displaceable by the cylinder to displace the driver whereby to displace each connected drive member towards and away from the
20 casing.

According to the invention, there is A lock including a bolt comprising a latch bolt having an alternative associated auxiliary bolt supported in the casing, said bolt being displaceable between a fully extended position where the bolt protrudes from
25 the casing and a retracted position in which it is substantially within the casing,

operating means by which to displace the latch bolt towards the retracted position including an angularly displaceable unlatching rocker operably associated with an exterior and interior hand operable lever,

deadlocking means to restrain the latch bolt in the fully extended position
30 including an alternative locking slide biased towards the bolt and a cylinder including a key operable barrel that is operably connected to the alternative locking slide,

said alternative locking slide having a horizontally elongated ramped shoulder projecting towards the alternative auxiliary bolt with a horizontal engageable face,
35 said alternative auxiliary bolt also includes a horizontally elongated ramped shoulder projecting towards to deadlocking slide with a horizontal engageable face projecting towards to deadlocking slide,

said alternative auxiliary bolt rearward end being biased and displaceable towards the alternative locking slide; the arrangement being configured such that in a pre-latching configuration, the engageable face of the alternative locking slide is above the engageable face of the alternative auxiliary bolt and the alternative locking slide abuts the bolt to be restrained by the bolt; in the third locked configuration the alternative locking slide lies behind the bolt to deadlock the bolt such that it cannot be retracted by lever operation and the alternative auxiliary bolt is substantially depressed, at which time

the cylinder can be operated to displace the alternative locking slide to the undisplaced position during which displacement the ramped engageable horizontal face of the slide passes over the ramped engageable horizontal face of the auxiliary bolt by displacing the auxiliary bolt sideways against spring bias, said auxiliary bolt subsequently ramped engageable horizontal face being displaced towards the alternative locking slide to engage the said slide,

subsequent displacement of the auxiliary bolt as the auxiliary bolt displaces to the fully extended position causes the ramped engageable horizontal face of the bolt to displace from above the ramped engageable horizontal face of the alternative locking slide to thereby release the slide to assume the position corresponding to the pre-latching configuration.

According to the invention, there is a lock including a casing having a front plate, an angularly displaceable driver operably connectable to an upper remote engaging member by an upper vertically elongated drive member and/or connectable to a lower remote engaging member by a lower vertically elongated drive member,

at least one hand operable angularly displaceable lever having a free end and at least one angularly displaceable unlatching cam to operably connect the driver to the at least one lever, each connected drive member being displaceable towards and away from the casing by displacement of the free end,

said lock further including a locking plunger that protrudes from the front to be displaceable to engage in a recess in the driver whereby to restrain the driver against displacement.

According to the invention, there are locks substantially as described herein with reference to and as illustrated in the accompanying drawings.

In some forms, the bolt is outwardly displaceable by deadlocking slide displacement.

In some forms, the bolt comprises an outwardly biased chamfered bolt.

In some forms, the bolt comprises an outwardly biased prism-like latch bolt having an associated auxiliary bolt and an associated control slide

5

In some forms, the bolt comprises an outwardly biased prism-like latch bolt having counteracting hooks and having an associated auxiliary bolt and an associated control slide

- 10 In some forms, bolt having a first portion substantially comprising a prism-like solid having a leading end chamfered and/or curved, or otherwise profiled on each side to assist latching wherein the latch bolt is engageable on either side by a strike plate to be inwardly displaced by the strike plate during latching, said profiling in some forms comprising a simple radius on the edge defining the junction between the side of the
15 bolt and the outer end of the bolt

In some forms, lock according to any one of the above claims, wherein the locking means includes a locking lever.

- 20 In some forms, the locking means includes a cylinder.

In some forms, the cylinder comprises a double cylinder.

In some forms, the the cylinder comprises a free-rotation-cylinder.

25

In some forms, the lock includes deadlocking slide wherein the lock is characterized by a second locked configuration.

- 30 In some forms, the lock includes an adapted deadlocking slide or an adapted locking slide, wherein the lock is characterized by a third locked configuration.

In some forms, the lock includes a cylinder wherein the lock is characterized by a first locked configuration.

35

In some forms, the lock includes a first and second locked configuration according to any one of the above claims, wherein the deadlocking slide supports a spring loaded ball that is engageable in recesses in the side of the casing corresponding to an undisplaced slide and a deadlocked slide in the second and first deadlocking configuration

In some forms, the lock includes a first and third locked configuration according to any one of the above claims, wherein the deadlocking slide supports a spring loaded ball that is engageable in recesses in the side of the casing corresponding to an undisplaced slide and a deadlocked slide in the third and first deadlocking configuration,

In some forms, the lock includes a lever locking cam supported on the underside of the exterior lever backplate 77 to operably couple the spindle and exterior lever.

In some forms, the exterior lever backplate supports a displaceable stop blade 83 operably connected by an arm 84 to the spindle, said stop blade being displaceable by spindle rotation to engage in a stop slot of a stop washer attached to the exterior lever

In some forms, the lock includes a driver having a locking shoulder and an unlocking shoulder that in a form of the member is defined in-part by a recess therebetween, that are engageable by each drive arm comprising a radial extension of each unlatching cam.

In some forms, the lock includes a driver having a driver locking recess and the deadlocking slide is connected to a driver locking slide 110 having a stop shoulder 111 that is displaceable into the driver locking recess to restrain it from being displaced from the fully displaced position corresponding to extended drive slides, said restrained configuration corresponding to a first locked configuration of the lock.

In some forms, the lock includes means of assembling springs into the casing after the sides have been fixed.

In some forms, the lock includes a strike plate having the wing portion connected to fixable portions by deformable bridge portions.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Definitions and Conventions Employed

This specification and provisional applications associated with this application, describe inventions comprising improved complete locks for displaceable wings and improvements for locks for displaceable wings transportable into other locks and locking devices without being limited to the complete locks described herein, these inventions, for convenience being referred to herein as ["locks"].

This specification describes locks substantially as described herein with reference to and as illustrated in the accompanying drawings.

Throughout this specification and claims which follow, unless the context requires otherwise, the word "comprise", or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

Throughout this specification and claims which follow, unless the context requires otherwise, the positional prepositions such as rear, forward are used to assist in description of the preferred embodiments and with reference to the accompanying drawings and have in general no absolute significance.

Throughout this specification and claims which follow, unless the context requires otherwise, the words wing embraces both doors and windows.

Throughout this specification and claims which follow, unless the context requires otherwise: **latching** means displacement of an engaging member against biasing means by an engageable means and subsequent displacement of the engaging member into engagement with the engageable means under the action of the **biasing means**, (for hinged doors [within this application] this comprises displacement of a latch bolt or {latch bolt and an auxiliary bolt} towards the lock casing by the wing of a strike plate and subsequent displacement of the latch bolt into the **aperture of the strike plate**) , (for sliding doors [within this application] this comprises displacement of a latch bolt with hooks or {latch bolt with hooks and an auxiliary bolt} towards the lock casing (as a result of the lock being displaced rectilinearly towards the catch plate) and subsequent displacement of the latch bolt with hooks into the aperture of the **catch plate** and displacement of the hooks outwardly to overlap the aperture peripheral edge whereby to longitudinally engage the catch plate; within this application a bolt is rectilinearly displaceable between a fully extended position in which it engages in an aperture and a retracted position where it is removed from the aperture, (said removed position coinciding with the bolt being substantially within the casing) ; a **latch-bolt** or **latch bolt** is an outwardly

biased bolt capable of executing latching and normally having a leading end that is chamfered or otherwise profiled on one side to facilitate latching [in the context of this application] a latch bolt also includes a prism shaped bolt that is restrained in a partly extended pre-latching configuration to facilitate latching, said prism shaped bolt in

5 some forms including counter-acting hooks, said prism shaped bolts in some forms having a leading end that is chamfered, curved or otherwise profiled on both sides to assist latching; an **auxiliary bolt** means an outwardly biased plunger that is operably associated with the prism shaped latch bolt; **unlatching** means withdrawal of the latch-bolt from engagement with the engageable means, (for hinged door it means

10 withdrawal of the bolt from the aperture of the strike plate); an **unlatching lever** is a lever or knob that is hand operable to cause the latch-bolt to become unlatched; **locking** means configuring the lock to restrain it from being unlatched and in some forms of locks employing deadlocking slides, it includes restraining the deadlocking slide in an operative position to thereby restrain the bolt from being inwardly

15 displaced by the unlatching lever; **deadlocking means** means to configure the lock to restrain the bolt from being displaced from the configuration that it assumes when engaged with the engageable means (in the case of a rectilinearly displaceable bolt for a hinged door, it means restraining the bolt in a fully extended position), the deadlocking means in some forms includes a **deadlocking slide** that is displaceable

20 to cooperate with the bolt to restrain it against displacement; **deadlocked** means the bolt cannot be displaced from the extended position by external forces; **deadlatching** means the bolt is automatically deadlocked during latching; **remote lock** means a locking means disposed from the lock that includes a remote bolt that is operably connected to the lock (often there is an upper and a lower remote lock situated above

25 and below the lock; **French door** means a door comprising a frame with a glass in-fill and often configured in pairs, a second door that is normally closed and is secured by vertical bolts and a first door that has the lock body and operable levers, often they have a strip of compressible sealing material located on the edge against which the first door closes to prevent energy loss, in many forms the door comprises a hollow

30 frame where the hollow within the frame is comparatively small in depth, **security doors** means a door comprising a hollow framed door with an in-fill of mesh or woven stainless steel where the hollow within the frame is comparatively small in depth and in width; **lock body** is the lock portion fitted within the hollow frame of the wing, the lock body together with a strike plate, a pair of handle sets and a double

35 cylinder comprising a typical mortice lock; **depth of lock body** is the extent of the lock body in a direction parallel to the face of the door; **width of lock body** is the extent of the lock body in a direction at right-angles to the face of the door; **free-**

rotation-cylinder is a cylinder comprising a key operable barrel within a **cylinder housing** connected to a **first cam** (in one form having a radially protruding arm) with free movement; **free-rotation-double-cylinder** comprises a cylinder sub-assembly comprised of opposed barrels each connected with free movement to the same first cam such that the cam is free (between limits) to be angularly displaced while the barrels remain undisplaced, this type of cylinder being commonly used in security door locks in Australia to enable the cam to be displaced by either barrel to a locking configuration and then the barrel to be reverse rotated to an undisplaced position enabling key removal while leaving the first cam in the locking position, (this type of cylinder being distinct from the more commonly used double cylinders that employ clutches and that do not have free rotation between the barrels and first cam); **clutched-cam-double-cylinder** comprises a cylinder sub-assembly comprised of opposed barrels each connectable without free movement to the same first cam such that the cam can be angularly displaced by a barrel while the other barrel remain undisplaced, the cylinder includes a clutch to select which barrel is the operative barrel, said clutch being operated by key insertion. In forms of both clutched and free rotation cylinders, the interior key operable is replaced by a hand and operable turn knob.

Description of the Figures

Embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings in which:

Fig 1 is a schematic side view of a lock body with the lid removed and placed beside the lock body, with the bolt fully extended, the unlatching cam at the "undisplaced orientation" and the deadlocking slide is downwardly disposed to enable the cylinder cam arm to enter the deadlocking slide drive recess,

Fig 2 is the lock of Fig 1 but with the deadlocking slide upwardly displaced by the cylinder screw to be in the "undisplaced position",

Fig 3 is the lock of Fig 2, but with the deadlocking slide further upwardly displaced to deadlock the bolt in the "second locked configuration",

Fig 4 is the lock of Fig 3, but with the deadlocking slide further upwardly displaced to deadlock the bolt in the "first locked configuration",

Fig 5 is the lock of Fig 4 from the underside with the side removed,

Fig 6 is the lock of Fig 1 with the deadlocking slide in the "undisplaced position" and the bolt displaced to the retracted position by the unlatching cam

Fig 7 is the lock of Fig 1 with the deadlocking slide in the "undisplaced position" and the bolt in the "pre-latching configuration"

Fig 8 is the lock of Fig 1, with the bolt fully extended, the deadlocking slide in the "undisplaced position" position, the unlatching cam displaced anticlockwise, and drive slides displaced,

Fig 9 is the lock of Fig 8, with the unlatching cams returned to the "undisplaced position" and the drive slides fully displaced,

Fig 10 is the lock of Fig 9 from the underside with the side removed,

Fig 11 is the lock of Fig 3, but with a modified deadlocking slide in the "third locked configuration",

Fig 12 is the lock of Fig 11, with an unlatching slide angularly displaced to partly retract the bolt,

Fig 13 is the lock of Fig 10, but with a modified deadlocking slide in the "third locked configuration" and the locking cam omitted,

Fig 14, is an isometric view of the lock of Fig 11,

Fig 15, is an exploded view of the lock of Fig 14,

Fig 16 is an isometric view of the lock of Fig 14 from the other side,

Fig 17 is an exploded isometric view of the lock of Fig 16,

Fig 18, is an isometric view showing the lock body and underside of the exterior handle assembly,

Fig 19, is an isometric view of forms of forms of bolts and a strike plate

Fig 20, is an isometric view of a wing supported an opening with a lock

Fig 21, is an isometric view of handles and a lock body.

Fig 22 is an isometric view of the bolt for sliding doors

Fig 23 is an isometric view of the automatic deadlock

Integers from which locks as shown in Fig 1 and Fig 17 are comprised include a **bolt 1** and a **casing 2**, said casing in some forms comprising **sides 3** attached to each other by **internal fixed portions 4** by rivets 6A comprising extensions of the fixed portions that have passage through apertures 6B in the casing sides and attached to a **front plate 5**, said front plate preferably being attached by **screws 6** having passage through **apertures 7** in the front plate to engage in **recesses 8** in the internal fixed portions, while in other cases a **spacer 9** member is between the front plate and sides to provide a lock of increased backset. In other forms the front plate internal fixed portions and a side comprise a single member such as a single casting to which a separate side is attached.

The bolt comprises a **first portion 11** that is displaceable from the casing by having passage through a **bolt aperture 12** in the front plate a **return portion 13** within the casing by which the bolt is supported. In some forms, the **first portion** comprises a substantially prism-like solid as shown in Fig 19, while in other forms the

first portion comprises substantially half a solid prism having a chamfer on one side that extends from top to bottom and extends from the **leading end 14** to the portion adjacent the bolt aperture in the front plate of a fully extended bolt – i.e. as is common in latch bolts; in other forms again, the first portion comprises a substantially

5 prism-like solid having a vertical slot extending from top to bottom in which are supported a pair of counter-acting pivotal hooked arms that are displaced from the upper side and lower side of the bolt as the bolt displaces to the fully extended position (it should be noted that this type of bolt must comprise a latch bolt having a pre-latching configuration whereby to facilitate latching with a catch plate, as shown

10 in Fig 22.

In some locks, the corners of the upper and lower edges of the bolt aperture are radiused to provide increased front plate strength and the upper and lower edges of the bolt are configured to conform to the aperture profile with working clearances

The bolt having a first portion substantially comprising a prism-like solid, in

15 some forms, comprises an outwardly biased latch bolt, that in some forms has the **leading end 14** profiled on both sides wherein the leading portion is chamfered and/or curved, or otherwise profiled on each side to assist latching wherein the latch bolt is engageable on either side by a strike plate to be inwardly displaced by the strike plate during latching, said profiling in some forms comprising a simple radius

20 on the edge defining the junction between the side of the bolt and the outer end of the bolt, said profiling accommodating both left hand and right hand doors, as shown in Fig 19.

Where the bolt has a first portion substantially comprising a prism-like solid, the lock includes an outwardly biased **auxiliary bolt 16** to facilitate latching, said

25 biasing being derived from **spring 17** that acts between an upwardly projecting **wing 17B** of the auxiliary bolt and the rivet 31, said auxiliary bolt comprising a **first auxiliary bolt portion 18** (preferably being a substantially triangular solid) that protrudes from the front plate and that is displaceable into the casing by having passage through an **auxiliary bolt aperture 19** in the front plate and a **return**

30 **auxiliary bolt portion 20** within the casing by which it is supported.

The first auxiliary bolt portion in some forms comprises a prism-like member having a **leading end 21** profiled on both sides to accommodate both left hand and right hand doors wherein the profiled portion on each side is curved, chamfer or otherwise profiled sides to facilitate latching wherein the auxiliary bolt is engageable

35 on either side by a strike plate to be inwardly displaced by the strike plate during latching.

The return portion 20, as shown in Fig 17 and Fig 15, has an **engaging shoulder 23**, protruding outwardly towards an adjacent rectilinearly displaceable **control slide 24** that is located within the casing between a side wall and the return portion 20, said control slide having an engageable outwardly disposed and upwardly **ramped shoulder 25** that lies in the same vertical plane as the engaging shoulder 23, a plane parallel the side of the casing, and below the engaging shoulder 23. As the auxiliary bolt is inwardly displaced (against biasing means derived from spring 17) the engaging shoulder 23 slides along the ramped shoulder 25 to urge the control slide away from the bolt to displace the **control shoulder 26** of the control slide away from the bolt to enable it to be displaced to the fully extended position by biasing means derived from **spring 27** as will be explained in more detail below.

This arrangement is used to restrain the substantially prism-shaped latch bolt, in a partly extended position prior to latching to facilitate latching of a bolt that otherwise would protrude too far to be latched and in the case of a conventional strike plate it would protrude beyond the curved lip. The control slide leading end control shoulder 26 is engageable in the **side recess 28** of the bolt and it is urged towards this engagement by **spring 29** housed in a recess of the said slide.

The bolt is displaceable between a fully extended position in which it would engage in a strike plate aperture, as shown in Fig 1, and a retracted position where it would be removed from the aperture (said removed position coinciding with the bolt being substantially within the casing as shown in Fig 6). In normal usage, as the bolt is displaced to the retracted position by lever operation, the control shoulder 26 slides along the face of the bolt, after the wing has been opened the lever is reversed towards the undisplaced position while the bolt outwardly displacing during which displacement the control portion displaces into the recess 28 to restrain the bolt in the pre-latching configuration.

Integers include an **unlatching rocker 30** as shown in Fig 6, angularly displaceable about a **pivotal axis 32** that is orthogonal to the side of the casing and supported by a **pinned extension 31** that in some forms comprises a rivet that passes from one side of the casing to the other, said rocker having a **first arm 33** extending upwardly from the pivotal axis to terminate in an engageable **shoulder 34** while the **second arm 35** extends downwardly to overlap the return bolt portion to be operably connected to the bolt such that the bolt is inwardly displaceable by anti-clockwise angular displacement of the unlatching rocker. In forms of the invention, the overlapping second arm portion includes a sideways protruding **drive pin 36** as shown in Fig 17, that locates within a **drive recess 37** of the bolt.

Integers include means to outwardly bias the latch bolt comprising the **spring 27** that in a form of the invention acts directly on the bolt but in other forms acts on the second arm of the rocker to outwardly bias the bolt by outwardly biasing the second rocker arm.

5 Integers include operating means by which to displace the bolt towards the retracted position including at least one **unlatching cam 39** connected by a **shaft 40** that extends to an external hand operable lever. In some forms of the invention the shaft extends between an **exterior lever 41** and an **interior lever 42** as shown in Fig 21, while having passage through a mating **drive aperture 43** in the unlatching cam, 10 each said lever comprising a hand operable member and being part of a **handle assembly 44** mounted to the face of the wing. Each unlatching cam has a downwardly extending **unlatching arm 45** that has towards the free end a **driving shoulder 46** that is rearward of the rocker first arm and within the same plane such that downwards lever operation displaces the driving shoulder clockwise to displace 15 the rocker 20 in an anti-clockwise direction to cause the bolt to retract. The unlatching cam is preferably supported by sideways protruding **cylindrical portions 47** as shown in Fig 15 and 17 that extends into a **circular aperture 47A** in a side of the casing and the cylindrical portion also preferably includes the shaft **drive aperture 43** to receive and mate with the shaft.

20 In some forms of locks, the **exterior lockable lever** can be independently locked from the interior by a locking-lever described below and these locks can be simultaneously unlocked and unlatched by operation of the interior lever. This functionality requires the lock to include an **exterior lever** connected to an **outer unlatching cam 48** by an **exterior shaft 49** and an **interior lever** connected to an 25 **inner unlatching cam 50** by an **interior shaft 51** (each said shaft mating without free movement in its respective associated unlatching cam and lever) each said unlatching cam preferably being supported adjacently and each having both an unlatching arm as described above and a drive arm as described below – importantly each is independently operable to retract the latch bolt.

30 Integers includes an interior hand operable locking member 52 as shown in Fig 21 and Fig 17, that is operably connected to a deadlocking slide as described below whereby to be operable to actuate the deadlocking slide to and from a second locked configuration, said locking member in one form comprises a **locking lever 52** (also called a **snib-lever**) that is connected by a **spindle 53** to an angularly 35 displaceable **locking cam 54** having a **spindle aperture 55** and a **locking arm 56**, said locking arm having a displaceable free end that is engaged (with free movement) within a recess within the deadlocking slide. In forms, the cam 54 is

supported by **cylindrical portions 54A** that are within **circular apertures 54B** in the sides of the casing, and in some forms the locking cam has a sideways protruding pin that engages in a horizontal slot in the deadlocking slide. The locking lever is configured such that it cannot be displaced to displace the deadlocking slide further than the second locked configuration (or third locked configuration described below).

Integers further include a **deadlocking slide 57** as shown in Fig 4, to restrain the bolt from being displaced from the fully extended position by external forces, said deadlocking slide that in some forms being co-operable with the fully extended bolt by means of a deadlocking slide **leading end 58** having an **engaging shoulder 58A** that is engageable behind an **engageable shoulder 59** of the bolt – the configuration in which the bolt and slide cooperate is referred to herein as the deadlocking configuration and when so engaged the deadlocking slide can be said to be in a deadlocking position and this position actually comprising a limited range of deadlocking slide positions over which the bolt and slide so cooperate. The deadlocking slide leading end 58 in some forms comprises a ramped portion engageable with the lower back corner of the bolt such that displacement of the deadlocking slide towards the bolt causes the ramp to slide over the corner to cause the bolt to be outwardly displaced.

Integers further includes an angularly displaceable **first cam 61** as shown in Fig 4, (having a radially protruding **cam arm 62**) that in some forms of locks is supported within the casing by the sides of the casing as occurs in the lock of [Watts AU 696343] to be operable by a barrel supported within each handle portion, [Watts AU 696343] herein being included by reference, and in other forms, the first cam is connected to a hand operable member that in some forms comprises an operable knob. The first cam in some forms of locks is as described in [Watts AU706589] which is included herein by reference, said first cam in some forms of locks comprising part of a sub-assembly comprising a **free-rotation-cylinder 63** as shown in Fig 15, defined above in the definitions that is assembled to the lock body as a whole and whereby the first cam is supported within the casing adjacent the deadlocking slide as shown in the figures. The first cam with the free-rotation-cylinder 63 in some forms is connected to a key operable single cylinder on each side but in other forms it is connected to a hand operable member that in some forms comprises an operable knob.

The first cam is operably connected to the deadlocking slide 57 by a **drive recess 64** having an **upper drive face 65** on which the first cam arm engages to drive the deadlocking slide towards the deadlocking configuration and having a **lower drive face 66** on which the first cam arm engages to drive the deadlocking slide from

the deadlocking configuration and an **exit shoulder 67** (in some forms comprising an angled face) connected to the upper drive face disposed such that when in the deadlocking slide is in the first locking configuration, the first cam end face **68** (a face of constant radius) is adjacent the exit shoulder such that the force that is applied to the first cam by the deadlocking slide when an attempt is made to move the deadlocking slide from the deadlocking configuration (as might occur in an attempt to rotate the snib lever) has a direction that passes through the **pivotal axis 69** of the cam and so the cam cannot be rotated and the first cam in this configuration restrains the deadlocking slide.

In some forms of locks, there are two locking modes: a **second locked mode** as shown in Fig 3 characterized by the first cam arm being within the drive recess and the deadlocking slide having been displaced into the deadlocking configuration by the locking lever or by the first cam a **first locked mode** as shown in Fig 4 characterized by the deadlocking slide being displaced into the deadlocking configuration and the first cam arm being displaced from within the drive recess to restrain the deadlocking slide in the deadlocking configuration from which the deadlocking slide cannot be displaced by the locking lever.

In some forms of the invention, the deadlocking slide supports a spring loaded ball **70** that is engageable in **recesses 71, 72, 73** in the side of the casing corresponding to an undisplaced slide, a deadlocked slide in the second locking configuration and a deadlocking slide in the first locking configuration and in some forms of locks the ball displaces with a vertically **elongated recess 74** of Fig 13.

Recess 71 in some forms, is sized to allowing passage of the ball to enable the ball and spring to be loaded after the lock body has (otherwise) been assembled.

In forms where the cylinder comprises a fixed cam cylinder there is no free movement between barrel and cam and the cam is operated by being rotated 360 degrees. In locks employing such cylinders, the locking lever and locking cam are omitted and the first cam is given space to fully rotate. In this case during locking, the first cam leaves the drive recess, passes over the exit face and comes to rest in the initial undisplaced position enabling key removal. In this case, the spring-loaded ball is engageable in recesses corresponding to an undisplaced slide and a lock in the first locked configuration.

In some forms of locks as shown in Fig 18, the exterior lever can be independently locked from the interior by the interior locking-lever and simultaneously unlocked and unlatched by operation of the interior lever. As with many of the improvements described herein that are transportable into other locks, this

functionality can be transported into security door locks that include a deadlocking slide and a locking snib as described in [Watts AU706589].

Such forms of locks, include a lockable **exterior lever 75** connected to an **outer unlatching cam** by an exterior shaft and an **interior lever** connected to an **inner unlatching cam** by an **interior shaft** as described above (each said unlatching cam having both an unlatching arm and a drive arm) and each being independently operable to displace the unlatching rocker to retract the latch bolt and each being independently operable actuate the driver annulus described below.

In these forms of locks the spindle of the locking lever has passage through the lock body to mate within a **lever locking cam 76** supported on the underside of the **exterior lever backplate 77**.

And the deadlocking slide described above is adapted as shown in Fig 11 to comprise an **adapted locking slide 79** that includes a ramped **unlocking shoulder 78** that in the **third locked configuration** (a configuration otherwise as the second locked configuration described above) is rearwardly disposed of the latch bolt as shown in Fig 11, and in some forms of locks where the bolt is deadlocked by the deadlocking slide when the lock is in the third locked configuration, the deadlocking slide comprises an **adapted deadlocking slide** that includes the ramped **unlocking shoulder 78** adjacent a **deadlocking shoulder 80** comprising part of the engageable shoulder 59 that in the **third locked configuration** are both rearwardly disposed of the bolt as shown in Fig 11, and where said deadlocking shoulder 80 is in the same plane as the engageable shoulder 59 to restrain the bolt from being inwardly displaced by means other than the unlatching rocker.

The unlocking shoulder is engageable by a **nose portion 81** of the second arm of the unlatching rocker as it rearwardly displaces to retract the latch bolt. The unlatching rocker is outwardly biased by spring 27 that acts on a protruding **pin 82** of the rocker second arm as shown in Fig 17 to outwardly bias the latch bolt and the bolt recess 37 is enlarged to provide the rocker sufficient free movement to displace rearwardly to enable the nose portion to displace the unlocking shoulder 78 whereby to displace the deadlocking shoulder from engageable shoulder 59 to enable the bolt to inwardly displace.

The second arm, deadlocking slide and bolt are configured such that when the bolt has been displaced to a partly retracted position, the deadlocking slide is displaced to the undisplaced position. The lock is further configured such that the undisplaced position of the deadlocking slide corresponds to an undisplaced locking cam and to an undisplaced locking lever and an undisplaced lever locking cam and an unlocked exterior lever.

The lever locking cam 76 supported on the underside of the exterior lever backplate 77 is operably connected to a **stop blade 83** by an **arm 84** mounted coaxially with the spindle, said stop blade being displaceable by spindle rotation to engage in a **stop slot 85** of a **stop washer 86** attached to the shaft portion of the exterior lever. The components are configured such that when the locking lever and spindle are undisplaced, the exterior lever is unrestrained but if the deadlocking slide is in the second locked configuration, the stop blade is within the stop recess restraining the exterior lever against displacement. When the interior lever is pushed down to retract the bolt, the deadlocking slide is displaced to angularly displace the locking cam to angularly displace the spindle to unlock the exterior lever. As will be appreciated, the exterior lever can also be unlocked by the cylinder from either side and by the locking lever. The stop blade comprises a part of a stop **slide 83A** that is biased by **spring 83B** away from the stop washer. The arm 84 comprises part of a semicircular disc having an arm 84 disposed on both sides of the spindle pivotal axis each said arm terminating in an engaging **shoulder 76B**. When the stop slide is undisplaced, the shoulders abut an adjacent horizontal lower edge of the stop slide that includes two **recesses 83B** one of which is engageable by a shoulder 76B when the spindle is in the third locked configuration. The recesses and shoulders are configured such that the slide 83A biased by spring 83B cannot dislodge a shoulder 76B from a recess, this being possible by spindle rotation alone. It will be appreciated that this arrangement also biases the locking lever towards an undisplaced position. I

In some forms of locks (that have a pre-latching configuration), the inventions comprise deadlatching locks having a **deadlatching bolt 87** that automatically deadlocks each time it extends to the fully extended position. In these forms of the invention the locking cam and locking member are omitted and the deadlocking slide comprises an alternative deadlocking slide biased by **spring 88** as shown in Fig 16 towards the second locked configuration, the ball is provided the vertically elongated recess 74 in which to unrestrainedly displace and the deadlocking slide includes a **spring recess 89** to house the spring. The alternative locking slide has a horizontally elongated ramped shoulder projecting towards the alternative auxiliary bolt with a horizontal engageable face, and the alternative auxiliary bolt also includes a horizontally elongated ramped shoulder projecting towards to deadlocking slide with a horizontal engageable face projecting towards to deadlocking slide. The alternative auxiliary bolt rearward end is biased and displaceable towards the alternative locking slide; the arrangement being configured such that in a pre-latching configuration, the engageable face of the alternative locking slide is above the engageable face of the alternative auxiliary bolt and the alternative locking slide abuts the bolt to be

restrained by the bolt; in the third locked configuration the alternative locking slide lies behind the bolt to deadlock the bolt such that it cannot be retracted by lever operation and the alternative auxiliary bolt is substantially depressed, at which time the cylinder can be operated to displace the alternative locking slide to the

5 undisplaced position during which displacement the ramped engageable horizontal face of the slide passes over the ramped engageable horizontal face of the auxiliary bolt by displacing the auxiliary bolt sideways against spring bias, said auxiliary bolt subsequently ramped engageable horizontal face being displaced towards the

10 alternative locking slide to engage the said slide, subsequent displacement of the auxiliary bolt as the auxiliary bolt displaces to the fully extended position causes the ramped engageable horizontal face of the bolt to displace from above the ramped engageable horizontal face of the alternative locking slide to thereby release the slide to assume the position corresponding to the pre-latching configuration.

Integers further includes drive means to operate an upper and/or a lower

15 remote engaging member, said drive means including one and in forms of the invention, a pair of counteracting drive slides operably connected to an angularly displaceable **driver 90** as shown in Fig 7 and 8 that in one form comprises a **drive annulus 91** having a base supported within the casing and in some forms of the invention supported within a raised **annular wall 92** that completely or partly

20 surrounds the drive annulus, said annular wall being supported by or comprising part of the the casing.

In a form of the invention, the driver member at radial distance from its **pivotal axis 93** (that is orthogonal to the side of the lock body) is connected to an **upper drive slide 94** by a **first joint 95** as shown in Fig 16, providing relative

25 angular displacement between the driver and upper drive slide and in some forms, the drive member is operably connected to a lower drive slide by a **second joint 96** as shown in Fig 14, said first and second joints comprising a pin extending between apertures in both the slide and the driver member and in some forms comprising a protruding pin of the driver within a substantially horizontal slot of the drive slide and

30 in forms of the invention the pins are disposed from the pivotal axis by the **same radial distance r, 97**.

In forms of the invention, the first joint is rearwardly disposed of the pivotal axis and the second joint is forwardly disposed and the joints are on opposite sides of the driver member as shown.

35 In forms of the invention the pivotal axis of the driver intersects the unlatching cam and in other forms again, the pivotal axis of the driver is forward of the pivotal axis of the unlatching cam and intersects the unlatching cam. In these forms the

cylindrical portions of each unlatching cam is supported in an aperture in the casing side walls that are within a circumference defined by a **radius r** about the axis of the driver and where the driver member takes the form of an annulus, each unlatching cam is within the annulus.

5 The driver has a **locking shoulder 100** and an **unlocking shoulder 101** that in a form of the member is defined in-part by a recess therebetween, that are engageable by each **drive arm 102** comprising a radial extension of each unlatching cam 39 and they are spaced such that when the driver member is undisplaced and each unlatching lever is undisplaced, the drive arm abuts locking shoulder 100 and
10 when the lever is lifted to fully displace the driver member (to actuate the drive slides to latch remote locks) the arm 102 engages **locking shoulder 100** to displace it downwardly as shown in Fig 8, and when the lever is then returned to the undisplaced position **drive arm 102** abuts **unlocking shoulder 101** as shown in Fig 9. When the lock is unlatched by pushing the lever down the drive arm displaces
15 **unlocking shoulder 101** to the undisplaced position to unlatch remote locks - the components are preferably configured such that the fully retracted latch bolt coincides with an undisplaced driver member.

In some forms of locks, both drive slides are towards the rear of the casing and in these forms, the second joint is connects by a flat elongated angled
20 **intermediate member 103** to the **free end 104** of an **intermediate rocker 105** by a **pin-joint 107**, said rocker extending from a **pivotal joint 106** shared with and located located forward of the casing to terminate in the free end rearwardly of the casing. The free end also shares a **pin joint 108** with a **lower drive slide 109** that extends from pin joint 108 to the lower end of the casing.

25 In normal usage, rotation of the drive annulus in a locking direction (anti-clockwise) by lifting the free end of an unlatching lever drives the upper drive slide upwardly and the lower drive slide downwardly by causing the intermediate member to pull the rocker downwardly. Preferably the upper and lower drive slides displace simultaneously in opposite directions and preferably the total displacement of each is
30 identical (although at any intermediate position this may not be so) and so preferably the lengths of the intermediate member, the length of the rocker and the location of the joints are configured to provide such. Rotation of the driver member in a unlocking and unlatching direction (clockwise) by lowering the free end of an unlatching lever drives the lower drive slide upwardly and the upper drive slide
35 downwardly.

In some forms of locks, the deadlocking slide is connected to a vertically elongated **driver locking slide 110** that has a **stop shoulder 111** that is

displaceable into a **driver locking recess 112** of the driver to restrain it from being displaced from the fully displaced position corresponding to extended drive slides, said restrained configuration corresponding to a first locked configuration of the lock. This configuration also has a **subsidiary locking recess 113** of the driver to restrain it from being displaced from the undisplaced position corresponding to retracted drive slides and a lock in the first locked configuration with undisplaced unlatching levers – this form of locking being additional to the locking provided by the deadlocking slide cooperating with the bolt as described above wherein when the bolt is restrained by the deadlocking slide the unlatching rocker is restrained by the bolt and so each unlatching lever cannot be operated.

Although (in the locks described immediately above) there is provision for operating remote locks, it will be appreciated that they may not, and need not, always be employed with the locks described above as the locks operate quite satisfactorily without the remote locks – for this reason it can be said that the remote locks or remote engaging members are operably connectable to the driver and are connectable to the drive slides because they can be connected when so desired.

In some forms of locks, the latch bolt, auxiliary bolt and locking cam are omitted to provide a lock for the fixed (first) door (that which has the strike plate attached) of a pair of French doors, said lock having one or a pair of remote bolts operated by an unlatching lever that is lockable as described above when a cylinder is included in the lock. In other forms of this lock, the lock body is adapted to include a recess for an outwardly biased locking plunger (not shown but similar to the auxiliary bolt) that is positioned adjacent the driver member that when depressed engages in a peripheral recess of the driver annulus to restrain it from being displaced from the fully displaced position corresponding to extended remote bolts. This **locking plunger** is depressed when the first door is closed wherein the front plate of the lock of the first door slides over the locking plunger to depress it to engage in the peripheral recess – by this means the fixed door is locked by the closing of the first door that preferably employs a lock with a latch bolt as described above.

In some forms of locks, there is means of releaseably restraining the driver member in the fully displaced position and to restrain driver member in the undisplaced position, said means including a **recess 114** within the side of the drive annulus and a **ball 116** biased towards the annulus by **spring 117** wherein the spring and ball are located within a substantially radially extended recess 117 within the casing.

Some forms of locks include, a **lower secondary slide 118** that is connected by a pin-joint to the lower drive slide, said lower secondary slide taking one of a number of forms to be compatible with the connecting vertically elongated member. In some lower secondary slides there is an aperture to receive the right angled return portion of a lower rod; in others, an aperture to receive a return portion of a lower Bowden cable and in some cases the slide has apertures to accommodate both. Where Bowden cables are employed the casing sides are horizontally slotted to receive wings protruding sideways from the ends of the outer cables. The secondary slide is supported adjacent one casing inside wall and the opposite side includes a vertically extended **fin 120** that is slideable within a **vertical groove 119** of a vertically extended portion of a casing fixed member. In other forms, the lower secondary slide comprises a bayonet like fitting that can receive spring-loaded jaws of a connecting lower rod. Similarly, in some forms there is an **upper secondary slide 118A** configured to accept different vertically elongated drive members. The upper secondary slide is supported adjacent one casing inside wall and is slideable within a **vertical channel 121** of a casing fixed member

In locks requiring the cable or rods to operate in the same direction, the lower secondary slide is connected to the **upper secondary slide** by a **secondary slide extension** that is also operably connected to the annulus by an **alternative first pin joint**, said secondary slide extension preferably comprising a resilient rod – accordingly, the casing internal fixed portions are adapted to provide passage for same – in other forms the secondary slide extension comprises two portions each having a return portion that are adjacently located within a recess of the annular driver to comprise an **alternative first pin joint**. This extension preferably passes behind the fully retracted bolt as does the lower drive slide described above and as shown in the figures.

In other forms of the invention (and where compression of a seal is not required) each drive arm 102 is omitted and the driver annulus is operably connected to the deadlocking slide by a vertically elongated **deadlocking slide extension** that shares an **alternative first pin joint** with the annulus, said deadlocking slide extension preferably comprising a rod that extends along the rear of the lock as does the secondary slide extension described above. In this form of locks, the deadlocking slide is preferably configured to displace the maximum possible (about 11 MM and this is defined by the geometry of the Euro style standard first cams) and as is common in security door locks. However, if the axis of the alternative pin joint is a lesser radial distance from the axis of the annulus than the first pin joint and they co-radial then a displacement by the deadlocking slide causes a larger displacement of

the drive slides sharing first and second pin joints. By this means the drive slides can be displaced the desired 15 MM by operation of the cylinder. It will be appreciated however, that such mechanisms cannot apply forces as large as those that can be applied by an unlatching lever. In these forms of locks, the remote bolts are operated by actuation of the key and/or locking lever as is common in security door locks.

In the context of this specification, a remote lock or remote engaging means or remote engaging member all include a simple plunger like member connected directly to a vertically elongated member that is connected to a drive slide and they all include a more sophisticated device where a remote bolt is actuated by an intermediated mechanism that in some cases includes a remote lock casing and in some cases includes means for separately deadlocking the remote bolt, wherein said independent deadlocking is effected by displacement of the associated drive slide.

Forms of the invention include a means of assembling springs into the casing after the sides have been fixed, this method comprising providing apertures within a side of the casing sufficiently large to provide passage for the spring that once installed is retained within the casing by spring force and/or the casing side.

Some forms of the above described locks are configured such that

- the upper and a lower drive slide each displace over a 15 MM range
- the bolt when fully extended protrudes 16 MM from the casing
- the bolt has a width of 13 MM
- the casing has a external width of 16 MM
- the casing internal width is 13 MM plus working clearance for the bolt
- the backset is 30 MM
- the casing depth is 41 MM
- levers that rotate less than 40 degrees to unlatch
- the distance between cylinder and lever axii of 85 MM
- the bolt is in the middle of the front plate
- the front plates are interchangeable
- the backset can be changed by the addition of spacers
- the casing length does not greatly exceed 155 MM

The inventions described herein are suitable for a displaceable wing 122 as shown in Fig 20, supported adjacent an opening 123. The wing has a closing edge 124 that is adjacent an element 125 that defines the opening when the wing is closed. In the case of hinged doors, the free edge of the door is adjacent the door jamb 126 when the door is closed and it is on this free edge that the lock body 127 is mounted. The lock body includes a casing having a front edge (that in the forms

described above comprises a front plate) and a displaceable bolt, said bolt being displaceable to a position where it protrudes from the casing relative to the front edge to engage the strike plate - the front edge including a bolt aperture to provides passage for the bolt.

5 Forms of the inventions include an improved **strike plate 128** that comprises a substantially conventional strike plate having a **wing 129** to facilitate latching, an **aperture 130** to provide passage for the bolt and upper and lower portions that are attachable (usually by screws) to the element defining the opening.

10 The aperture of the improved strike plate includes a **front edge 131** against which the bolt is urged when the door is urged in an opening direction as occurs when one attempts to force open a locked door. The substantially conventional strike plate in preferred forms, is modified to resist jemmying by enabling the portion of the strike plate adjacent the front edge to be displaced with the bolt while the portions attached to the opening remain attached to the opening while being subjected to
15 forces that tend to pull the strike plate away from the opening and that urge the fixing screws to pull out, however the further modified strike plate subjects the screws to considerably lower forces than are applied by a conventional strike plate. The aperture of this strike plate are within a substantially flat **plate-like portion 132** extending from between a **lower slot 133** to an **upper slot 134** and connected to the
20 strike plate **wing 133** that preferably comprises an angled or curved wing and each said slot extends from the **rear edge 135** to pass between the screw aperture and aperture and preferably each slot further extends to include a **vertical portion 136** between the screw aperture and wing. Importantly, the front edge of the aperture is within a portion of the strike plate that is connected to the wing so as to be displaced
25 with the wing.

The strike plate wing is connected by **bridges 137** of reduced cross-sectional area and the strike plate is of a deformable material enabling these bridges to deform without cracking and the reduced areas enables deformation to occur at reduced forces – these characteristics enabling the wing to be angularly displaced about a
30 **deformation axis 138** that passes substantially through each bridge. In forms where the front edge is rearwardly disposed relative to this deformation axis, rotation of the wing causes the front edge to be displaced towards the wing and bolt to bring the bolt into closer engagement with the strike plate. When a jemmy blade rests on the strike plate wing as it is rotated to part the wing from the opening, the blade angularly
35 displaces to deform the bridges and to cause the wing to rotate about the deformation axis.

The upper and lower extremes 139 of the plate-like portion (that portion between the apertures and the slots) are of reduced cross-sectional area to enable these portions to deform under low forces so as to deform as the blade portion angularly displaces about the deformation axis. When these portions are caused to engage the face of the lock they deform so as not to inhibit the displacement of the wing about the deformation axis.

The bridges connect to fixable portions 140 that include screw apertures 141 through which screws shanks have passage and by which the fixable portion is attached to the opening. In some types of deformation the fixable portions angularly displace about the screw to reduce the effective distance between bridges, and this feature combined with the fact that the wing is attached only at each to a bridge enables the wing and front edge to deform like a bow and at comparatively moderately low forces to thereby enable the front edge to displace with the bolt while the fixable portions remain attached to the opening while being subjected to reduced loads that urge the screws to pull out of the opening.

In common forms of jemmy attack, when a closed and locked door is urged open under the action of a jemmy blade placed adjacent the bolt, the bolt is forced against the front edge while the lock is simultaneously displaced away from the strike plate and as a result, the bolt (in part, as a result of friction between the bolt and front edge) causes the strike plate to deform to enable the front edge to displace with it.

Complete locks (complying with common functionality requirements) and comprising a combination of the integers described above

Passage Lock, F75 latch bolt operated by lever from either side at all times.

The lock has an outwardly biased latch bolt (comprising a chamfered bolt or a prism bolt (with or without hooks) and auxiliary bolt), an unlatching cam, an unlatching rocker body, interior and exterior levers connected to a single shaft, it does not have a cylinder or a locking member and the deadlocking slide and locking cam can be omitted from the lock

Privacy, F76 G2 and 3 a latch bolt operated by lever from either side except when levers are locked by locking lever (snib) on inside.

The lock has an outwardly biased latch bolt (comprising a chamfered bolt or a prism bolt (with or without hooks) and auxiliary bolt), an unlatching rocker and a single shaft, a locking member and a deadlocking slide, a lockable exterior lever and an interior lever each connected by separate shafts to a separate unlatching cam.

In this lock, the exterior handle set is adapted to include a locking lever comprising hand operable coin slot.

Patio, F77 G2 and 3 deadlocking latch bolt operated by lever from either side except when outside lever is locked by snib locking lever on inside. Automatic
5 unlocking when inside lever is rotated or unlocked by locking lever.

The lock has an outwardly biased latch bolt (comprising a chamfered bolt or a prism bolt (with or without hooks) and auxiliary bolt), unlatching rocker, a locking member, a locking cam and an adapted deadlocking slide having a deadlocking
10 shoulder and a ramped unlatching portion, a lockable exterior lever and an interior lever each connected by separate shafts to a separate unlatching cam. The improved lock, subject of this specification has provision to operate remote locks.

Entrance, F 81 deadlocking latch bolt operated by lever from either side except when outside lever is locked by locking lever on inside. When outside lever is locked, latch bolt is retracted by employing exterior key to displace the deadlocking
15 slide to the undisplaced position to enable the exterior lever to be operated or rotating interior lever. Locking lever must be operated to unlock exterior lever.

The lock has an outwardly biased latch bolt (comprising a chamfered bolt or a prism bolt (with or without hooks) and auxiliary bolt), unlatching rocker, a locking member, a cylinder with a key operable barrel and an adapted deadlocking slide
20 having a deadlocking shoulder and ramped unlatching portion, a lockable exterior lever and an interior lever each connected by separate shafts to a separate unlatching cam and no locking cam so the spindle passes through an aperture in the casing to mesh in member 76 of the exterior handle assembly. The casing in this function is modified by the inclusion of a casing shoulder to prevent the cylinder from
25 displacing the deadlocking slide from the third locked configuration to the first locked configuration.

The improved lock, subject of this specification has provision to operate remote locks.

The improved lock, subject of this specification has provision to operate
30 remote locks.

Entrance, F82 G 1 deadlocking latch bolt operated by lever from either side except when outside lever is locked by locking lever on inside. When outside lever is locked, the exterior lever may be operated after unlocking by key or by rotating
interior lever which unlocks the exterior lever.

35 The lock has an outwardly biased latch bolt (comprising a chamfered bolt or a prism bolt (with or without hooks) and auxiliary bolt), unlatching rocker, a locking member, a cylinder with an exterior key operable barrel and an adapted deadlocking

slide having a deadlocking shoulder and ramped unlatching portion, a lockable exterior lever and an interior lever each connected by separate shafts to a separate unlatching cam and a locking cam so the spindle passes through an aperture in the casing to mesh in the locking member 76 of the exterior handle assembly. The casing in this function is modified by the inclusion of a casing shoulder to prevent the cylinder from displacing the deadlocking slide from the third locked configuration to the first locked configuration.

The improved lock, subject of this specification has provision to operate remote locks.

Classroom, F84 deadlocking latch bolt operated by lever from either side except when outside lever is locked by key from exterior. When outside lever is locked, latch bolt retracted by rotating interior lever or by unlocking exterior lever by key and then operating exterior lever.

The lock has an outwardly biased latch bolt (comprising a chamfered bolt or a prism bolt (with or without hooks) and auxiliary bolt), unlatching rocker, a cylinder with an exterior key operable barrel and an adapted deadlocking slide having a deadlocking shoulder and ramped unlatching portion, a lockable exterior lever and an interior lever each connected by separate shafts to a separate unlatching cam and a the spindle that passes through an aperture in the casing to mesh in the locking member 76 of the exterior handle assembly. The casing in this function is modified by the inclusion of a casing shoulder to prevent the cylinder from displacing the deadlocking slide from the third locked configuration to the first locked configuration.

The improved lock, subject of this specification has provision to operate remote locks.

F91 deadlocking latch bolt operated by lever from either side except when both levers are locked by key from either side.

The lock has an outwardly biased latch bolt (comprising a chamfered bolt or a prism bolt (with or without hooks) and auxiliary bolt), unlatching rocker, a locking member, a cylinder with exterior and exterior key operable barrels, deadlocking slide, an exterior lever and an interior lever each connected to an unlatching cam by a single shaft, a locking cam and locking member, and a spindle that meshes with an aperture in the locking cam. The improved lock, subject of this specification has provision to operate remote locks.

Nightlatches automatic deadlocking when wing is closed. The deadlatching latch bolt is operated by lever from either side when lock is unlocked. The lock has an outwardly biased deadlocking latch bolt (comprising a chamfered bolt or a prism bolt (with or without hooks) and an alternative auxiliary bolt), unlatching rocker, a locking

member, a cylinder with an exterior key operable barrel and an alternative spring biased deadlocking slide having a deadlocking shoulder, an exterior lever and an interior lever each connected by a single shaft to an unlatching cam. The casing in this function is modified by the inclusion of a casing shoulder to prevent the cylinder from displacing the deadlocking slide from the second locked configuration to the first locked configuration. The lock is locked by key from either side to enable either lever to retract the bolt. The lock may also include a locking member and locking cam by which to unlock the lock.

The improved lock, subject of this specification has provision to operate remote locks.

The cylinders within the locks described above, (except for F91 which absolutely requires such) electively additionally include an interior key operable barrel OR an hand operable turn knob.

Multipoint Locks with provision to connect to upper and lower remote locks by a vertically displaceable counteracting drive members that displace simultaneously in the opposite direction.

These locks include a driver member within the lock casing located adjacent each unlatching cam to be displaceable by each unlatching cam to displace an upper and/or lower driver slide to which drive members can be connected to operate remote engaging members. The locks further include a latch bolt, unlatching rocker, deadlocking slide, locking cam and locking member, a double free rotation cylinder, and interior and exterior levers connected by a single shaft to the unlatching cams, said levers being rotated upwards to lock remote locks and downwards to unlatch the lock while simultaneously unlocking remote locks. The locks preferably include a driver locking slide so that in the first locked configuration, the driver is restrained against rotation. The locks alternatively have levers connected by separate shafts to separate unlatching cams and the exterior lever is lockable and the deadlocking slide comprises an adapted deadlocking slide.

In other forms of these locks, there is a driver member within the lock casing located adjacent each unlatching cam to be displaceable by each unlatching cam to displace an upper and/or lower driver slide to which drive members can be connected to operate remote engaging members. The locks further include a latch bolt, unlatching rocker, deadlocking slide, a double free rotation cylinder, and interior and exterior levers connected by a single shaft to the unlatching cams, said levers being rotated downwards to unlatch the lock while simultaneously unlocking remote locks. In these forms, the driver is connected to the deadlocking slide by a deadlocking slide extension to be displaceable by cylinder.

In other forms of these locks, there is provision to connect to upper and lower remote locks by a vertically displaceable drive member or members that displace simultaneously in the same direction.

The Claims defining the Invention Are:

Within the following claims, unless the context requires otherwise: **latching** means displacement of an engaging member against biasing means by an engageable means and subsequent displacement of the engaging member into engagement with the engageable means under the action of the **biasing means**, (for hinged doors [within this application] this comprises displacement of a latch bolt or {latch bolt and an auxiliary bolt} towards the lock casing by the wing of a strike plate and subsequent displacement of the latch bolt into the **aperture of the strike plate**) , (for sliding doors [within this application] this comprises displacement of a latch bolt with hooks or {latch bolt with hooks and an auxiliary bolt} towards the lock casing (as a result of the lock being displaced rectilinearly towards the catch plate) and subsequent displacement of the latch bolt with hooks into the aperture of the **catch plate** and displacement of the hooks outwardly to overlap the aperture peripheral edge whereby to longitudinally engage the catch plate; within this application a bolt is rectilinearly displaceable between a fully extended position in which it engages in an aperture and a retracted position where it is removed from the aperture, (said removed position coinciding with the bolt being substantially within the casing) ; a **latch-bolt** or **latch bolt** is an outwardly biased bolt capable of executing latching and normally having a leading end that is chamfered or otherwise profiled on one side to facilitate latching [in the context of this application] a latch bolt also includes a prism shaped bolt that is restrained in a partly extended pre-latching configuration to facilitate latching, said prism shaped bolt in some forms including counter-acting hooks, said prism shaped bolts in some forms having a leading end that is chamfered, curved or otherwise profiled on both sides to assist latching; an **auxiliary bolt** means an outwardly biased plunger that is operably associated with the prism shaped latch bolt; **unlatching** means withdrawal of the latch-bolt from engagement with the engageable means, (for hinged door it means withdrawal of the bolt from the aperture of the strike plate); an **unlatching lever** is a lever or knob that is hand operable to cause the latch-bolt to become unlatched; **locking** means configuring the lock to restrain it from being unlatched and in some forms of locks employing deadlocking slides, it includes restraining the deadlocking slide in an operative position to thereby restrain the bolt from being inwardly displaced by the unlatching lever; **deadlocking means** means to configure the lock to restrain the bolt from being displaced from the configuration that it assumes when engaged with the engageable means (in the case of a rectilinearly displaceable bolt for a hinged door, it means restraining the bolt in a fully extended position), the deadlocking means in some forms includes a **deadlocking slide** that is displaceable to cooperate with the bolt to

restrain it against displacement; **deadlocked** means the bolt cannot be displaced from the extended position by external forces; **deadlatching** means the bolt is automatically deadlocked during latching; **remote lock** means a locking means disposed from the lock that includes a remote bolt that is operably connected to the

5 lock (often there is an upper and a lower remote lock situated above and below the lock; **French door** means a door comprising a frame with a glass in-fill and often configured in pairs, a second door that is normally closed and is secured by vertical bolts and a first door that has the lock body and operable levers, often they have a strip of compressible sealing material located on the edge against which the first door

10 closes to prevent energy loss, in many forms the door comprises a hollow frame where the hollow within the frame is comparatively small in depth, **security doors** means a door comprising a hollow framed door with an in-fill of mesh or woven stainless steel where the hollow within the frame is comparatively small in depth and in width; **lock body** is the lock portion fitted within the hollow frame of the wing, the lock body

15 together with a strike plate, a pair of handle sets and a double cylinder comprising a typical mortice lock; **depth of lock body** is the extent of the lock body in a direction parallel to the face of the door; **width of lock body** is the extent of the lock body in a direction at right-angles to the face of the door; **free-rotation-cylinder** is a cylinder comprising a key operable barrel within a **cylinder housing** connected to a **first cam**

20 (in one form having a radially protruding arm) with free movement; **free-rotation-double-cylinder** comprises a cylinder sub-assembly comprised of opposed barrels each connected with free movement to the same first cam such that the cam is free (between limits) to be angularly displaced while the barrels remain undisplaced, this type of cylinder being commonly used in security door locks in Australia to enable the

25 cam to be displaced by either barrel to a locking configuration and then the barrel to be reverse rotated to an undisplaced position enabling key removal while leaving the first cam in the locking position, (this type of cylinder being distinct from the more commonly used double cylinders that employ clutches and that do not have free rotation between the barrels and first cam); **clutched-cam-double-cylinder**

30 comprises a cylinder sub-assembly comprised of opposed barrels each connectable without free movement to the same first cam such that the cam can be angularly displaced by a barrel while the other barrel remain undisplaced, the cylinder includes a clutch to select which barrel is the operative barrel, said clutch being operated by key insertion. In forms of both clutched and free rotation cylinders, the interior key

35 operable is replaced by a hand and operable turn knob.

Driver to operate remote bolts

'1 A lock including a casing with sides, a bolt supported in the casing to be displaceable between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,

5 an angularly displaceable driver operably connectable to an upper remote engaging member by an upper vertically elongated drive member and/or connectable to a lower remote engaging member by a lower vertically elongated drive member,

at least one hand operable angularly displaceable lever having a free end and at least one angularly displaceable unlatching cam to operably connect the bolt and
10 driver to the at least one lever,

wherein the bolt is displaceable towards the casing by downward displacement of the free end and each connected drive member is displaceable towards and away from the casing by displacement of the free end.

15 '2 A lock according to Claim 1, wherein the pivotal axis of the diver intersects through the unlatching cam.

'3 A lock according to Claim 1, wherein the diver comprises a substantially annular member supported within a substantially circular recess.
20

Exterior handle locking

'20 A lock including a casing with sides, a bolt supported in the casing to be displaceable between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,

25 operating means by which to displace the bolt towards the retracted position including an exterior and an interior hand operable lever operably connected to the bolt by angularly displaceable means,

deadlocking means by which to restrain the bolt in the fully extended position including an adapted deadlocking slide or an adapted locking slide and a hand
30 operable locking member that is operable to displace the said adapted deadlocking slide or an adapted locking slide, said adapted deadlocking slide or an adapted locking slide being displaceable by the locking member to a third locked configuration corresponding to the exterior lever being locked to be restrained against displacement,

35 said adapted deadlocking slide or an adapted locking slide being displaceable from the third locked configuration to unlock the exterior lever by displacement of the unlatching rocker caused by displacement of either lever.

'21 A lock according to Claim 20 wherein the angularly displaceable means comprises an angularly displaceable unlatching rocker

5 **Cylinder displaces driver**

'30 A lock including a casing with sides, a bolt supported in the casing to be displaceable between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,

an angularly displaceable driver operably connectable to an upper remote
10 engaging member by an upper vertically elongated drive member and/or connectable to a lower remote engaging member by a lower vertically elongated drive member,
deadlocking means by which to restrain the bolt in the fully extended position including a key operable cylinder and a deadlocking slide that is connected by a deadlocking slide extension to the driver,

15 said deadlocking slide being displaceable by the cylinder to displace the driver whereby to displace each connected drive member towards and away from the casing.

Automatically locking lock

20 '40 A lock including a bolt comprising a latch bolt having an alternative associated auxiliary bolt supported in the casing, said bolt being displaceable between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,

operating means by which to displace the latch bolt towards the retracted
25 position including an angularly displaceable unlatching rocker operably associated with an exterior and interior hand operable lever,

deadlocking means to restrain the latch bolt in the fully extended position including an alternative locking slide (without an unlatching ramped portion) biased towards the bolt and a cylinder including a key operable barrel that is operably
30 connected to the alternative locking slide,

said alternative locking slide having a horizontally elongated ramped shoulder projecting towards the alternative auxiliary bolt with a horizontal engageable face,
said alternative auxiliary bolt also includes a horizontally elongated ramped shoulder projecting towards to deadlocking slide with a horizontal engageable face projecting
35 towards to deadlocking slide,

said alternative auxiliary bolt rearward end being biased and displaceable towards the alternative locking slide; the arrangement being configured such that in a

pre-latching configuration, the engageable face of the alternative locking slide is above the engageable face of the alternative auxiliary bolt and the alternative locking slide abuts the bolt to be restrained by the bolt; in the third locked configuration the alternative locking slide lies behind the bolt to deadlock the bolt such that it cannot be retracted by lever operation and the alternative auxiliary bolt is substantially depressed, at which time

the cylinder can be operated to displace the alternative locking slide to the undisplaced position during which displacement the ramped engageable horizontal face of the slide passes over the ramped engageable horizontal face of the auxiliary bolt by displacing the auxiliary bolt sideways against spring bias, said auxiliary bolt subsequently ramped engageable horizontal face being displaced towards the alternative locking slide to engage the said slide,

subsequent displacement of the auxiliary bolt as the auxiliary bolt displaces to the fully extended position causes the ramped engageable horizontal face of the bolt to displace from above the ramped engageable horizontal face of the alternative locking slide to thereby release the slide to assume the position corresponding to the pre-latching configuration.

Fixed door lock

A lock including a casing having a front plate, an angularly displaceable driver operably connectable to an upper remote engaging member by an upper vertically elongated drive member and/or connectable to a lower remote engaging member by a lower vertically elongated drive member,

at least one hand operable angularly displaceable lever having a free end and at least one angularly displaceable unlatching cam to operably connect the driver to the at least one lever, each connected drive member being displaceable towards and away from the casing by displacement of the free end,

said lock further including a locking plunger that protrudes from the front to be displaceable to engage in a recess in the driver whereby to restrain the driver against displacement.

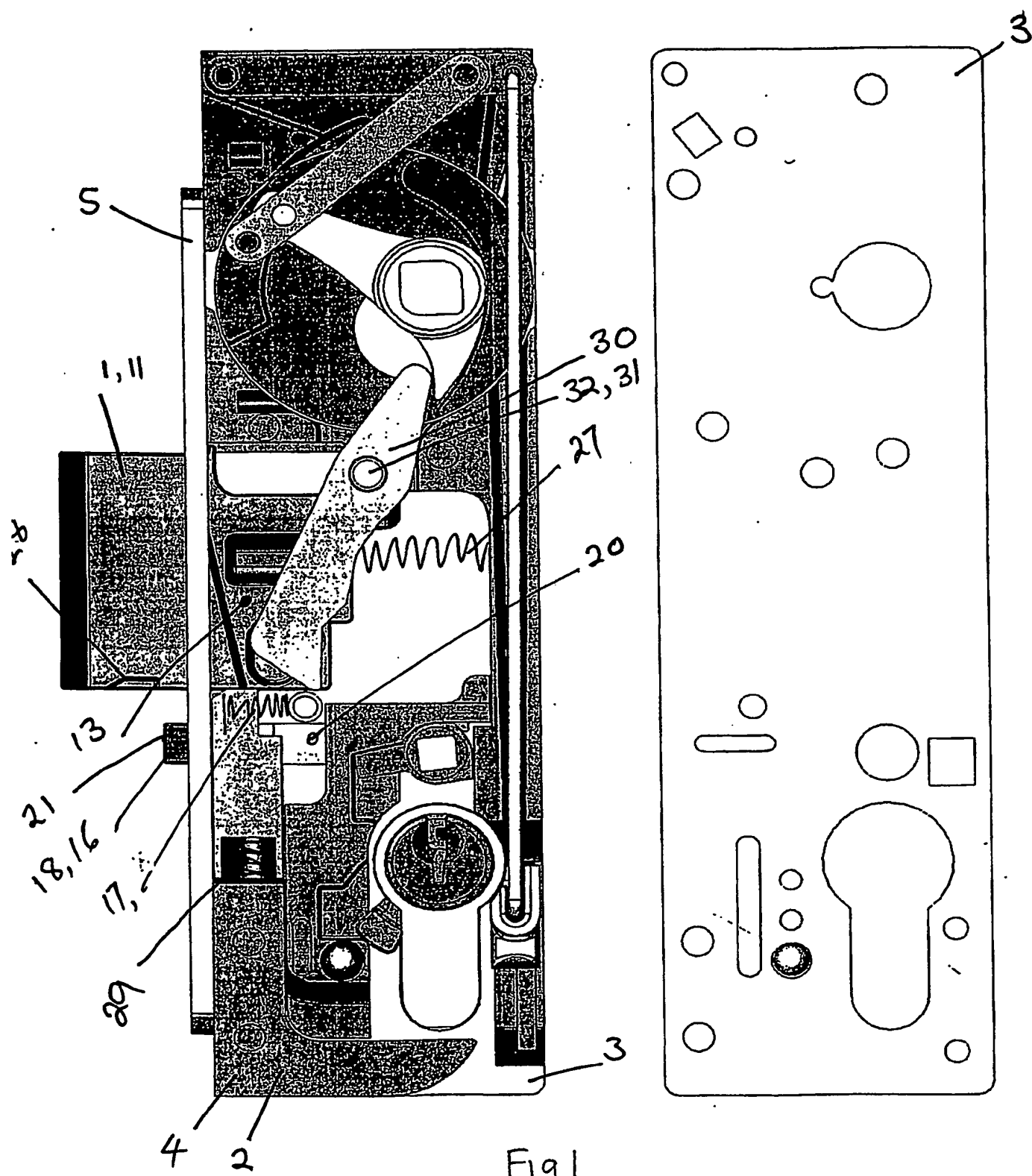


Fig 1

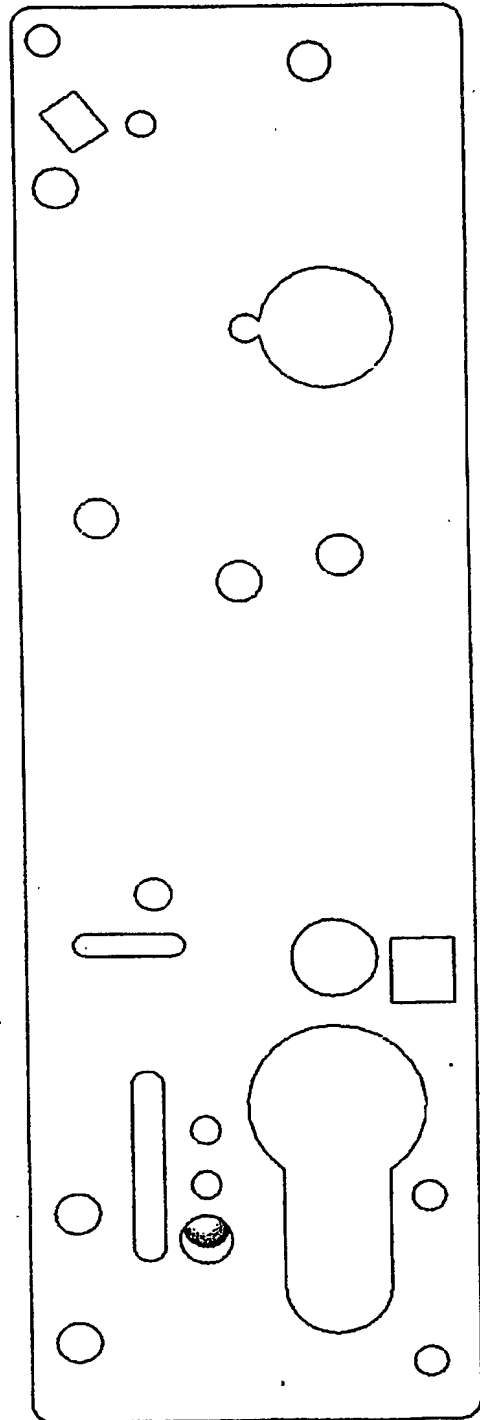
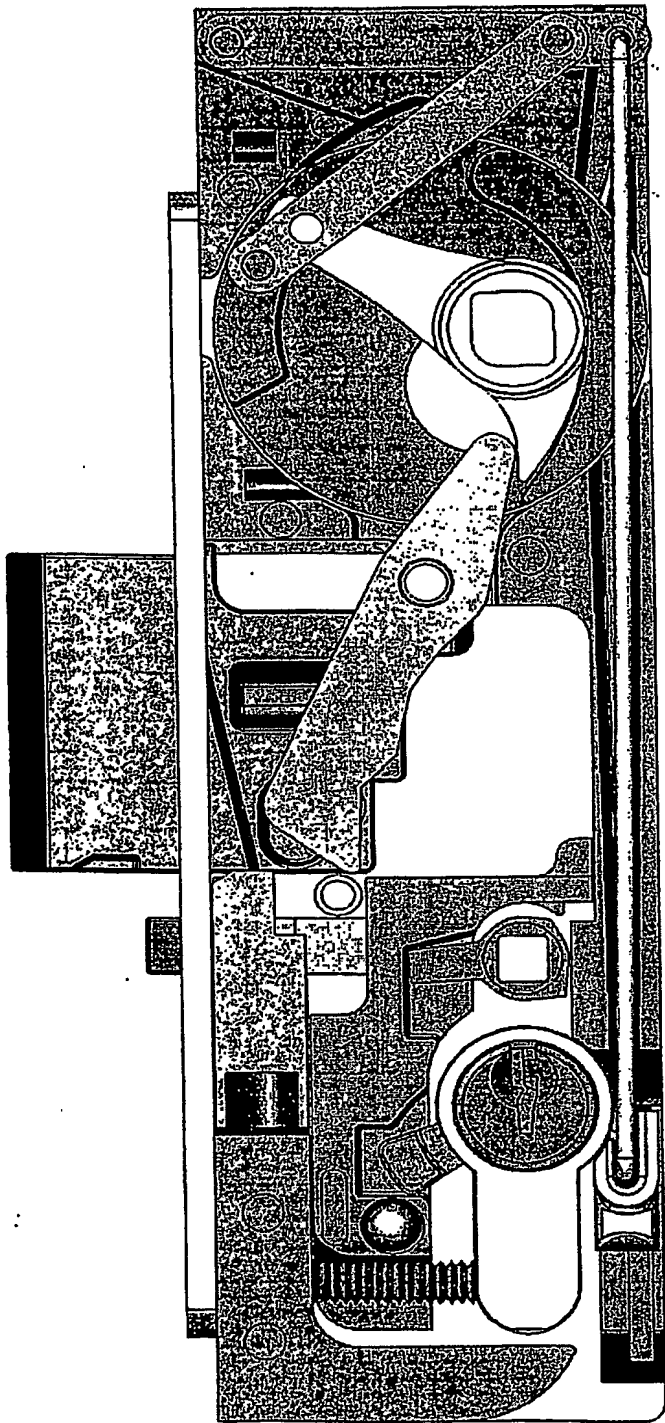


Fig 2

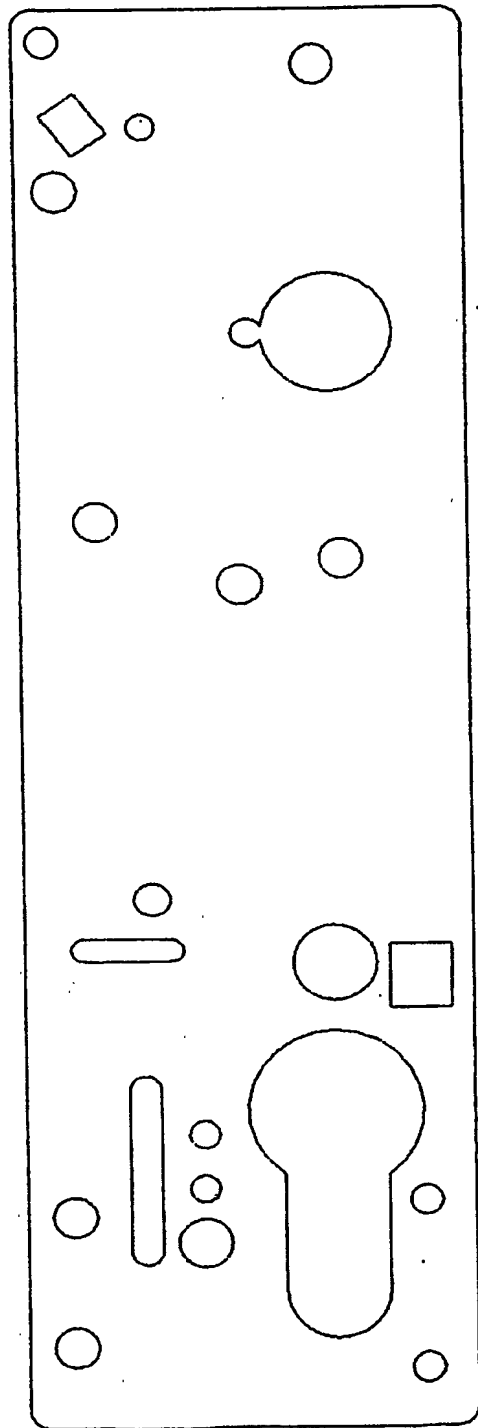
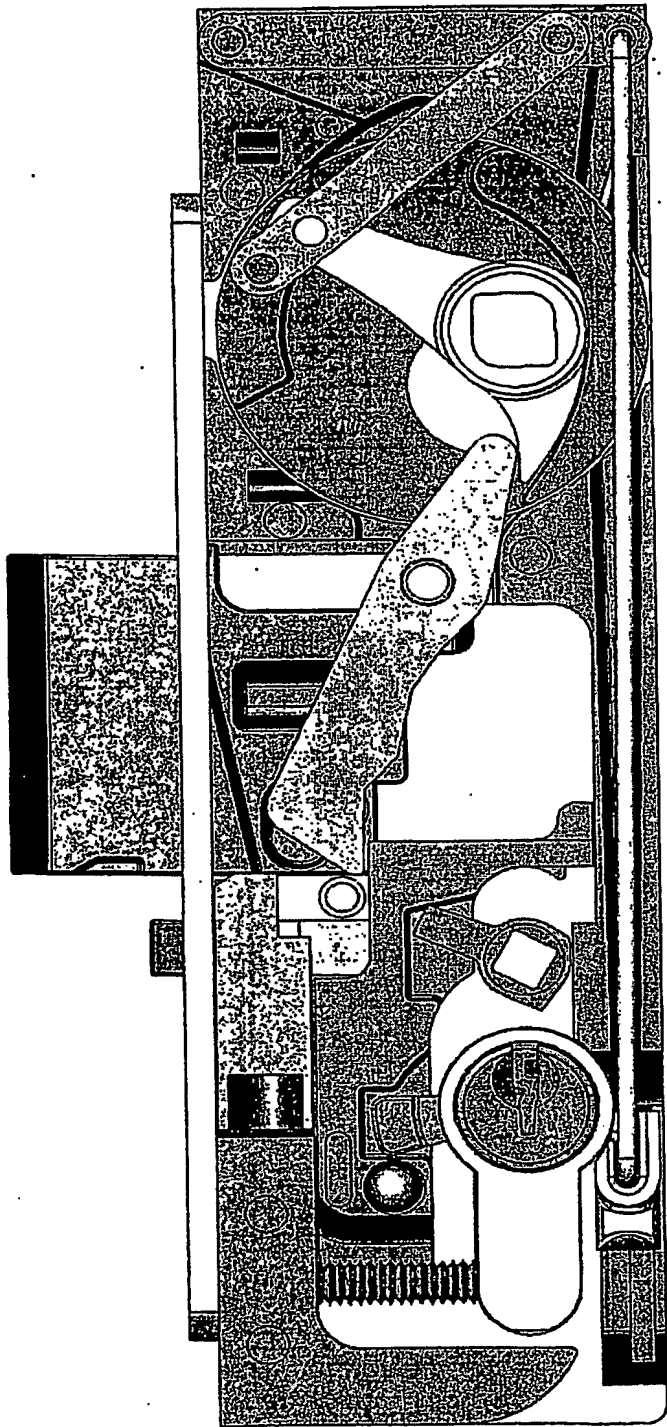


Fig 3

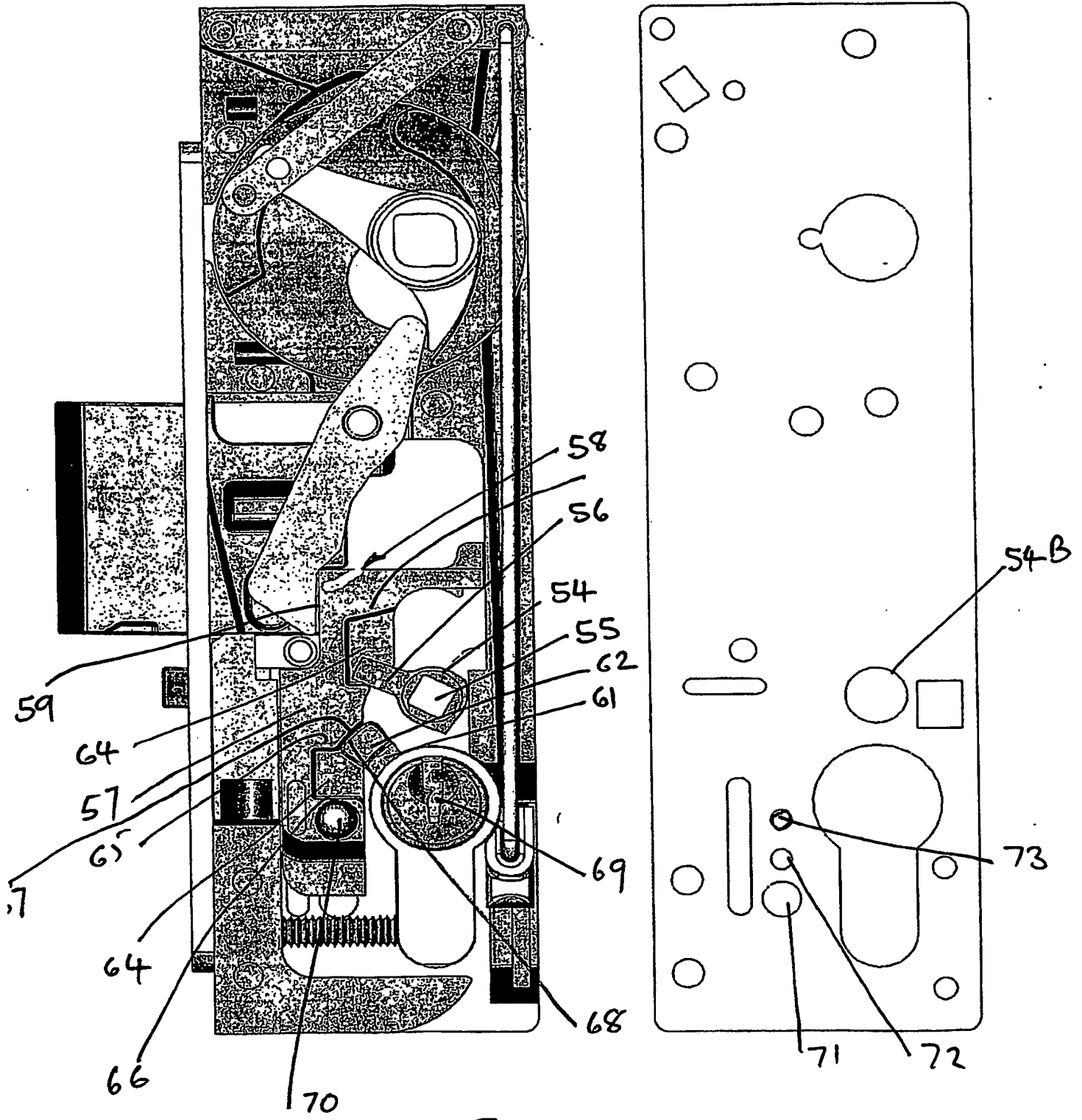
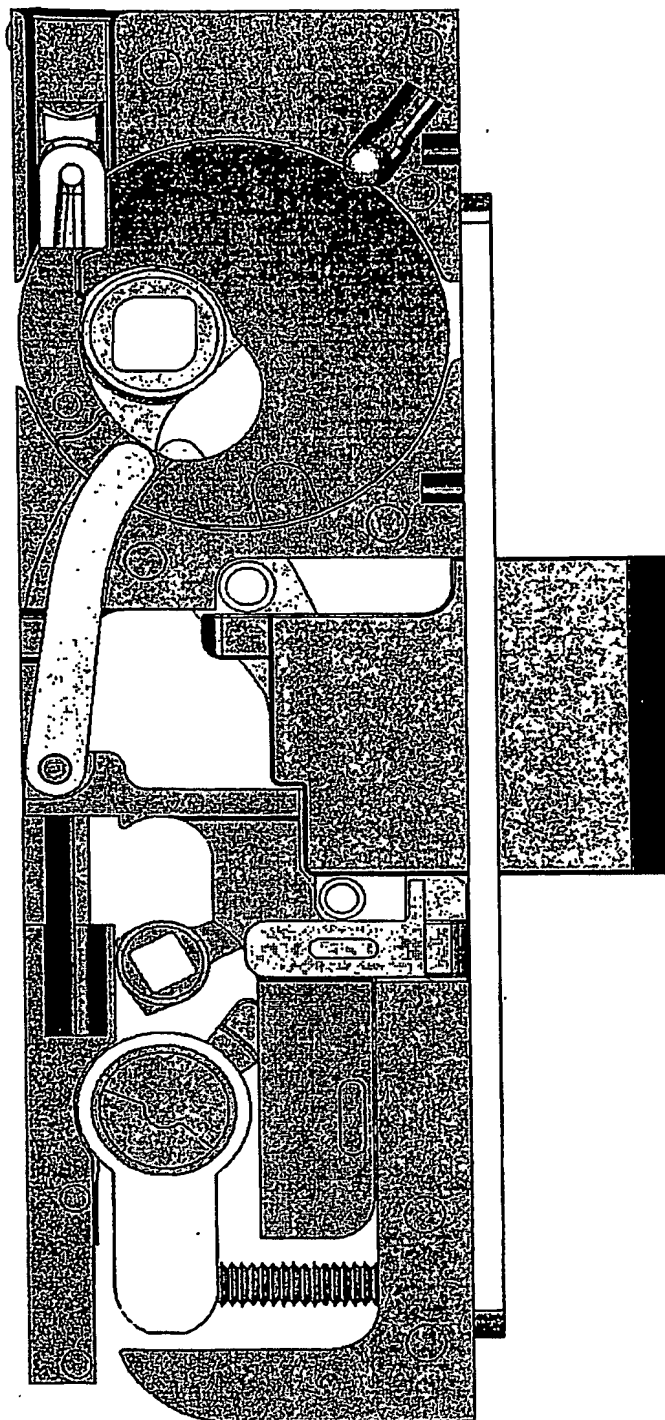
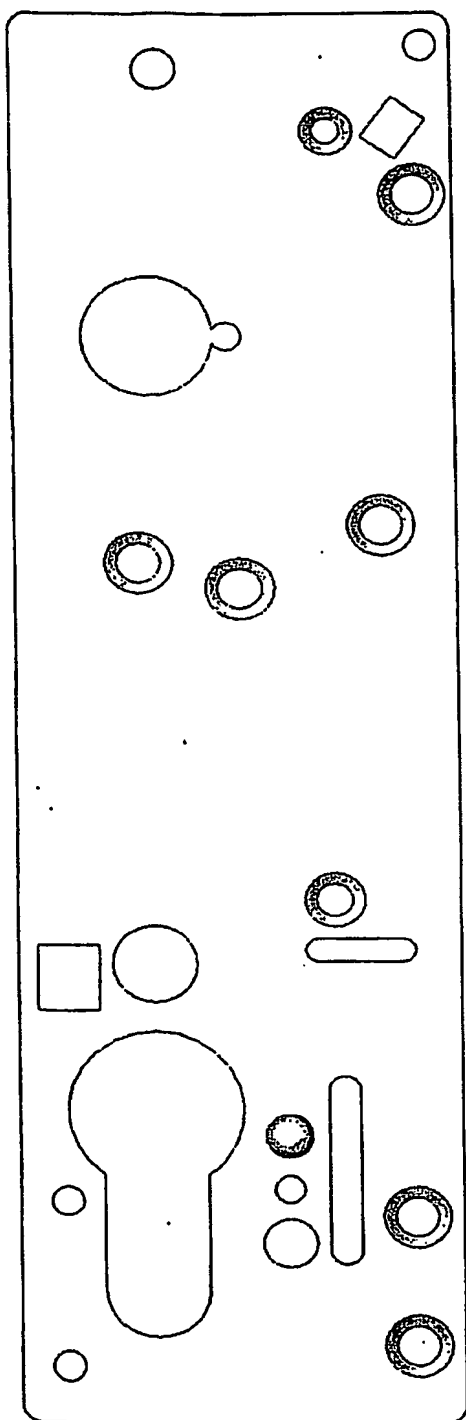


Fig 4



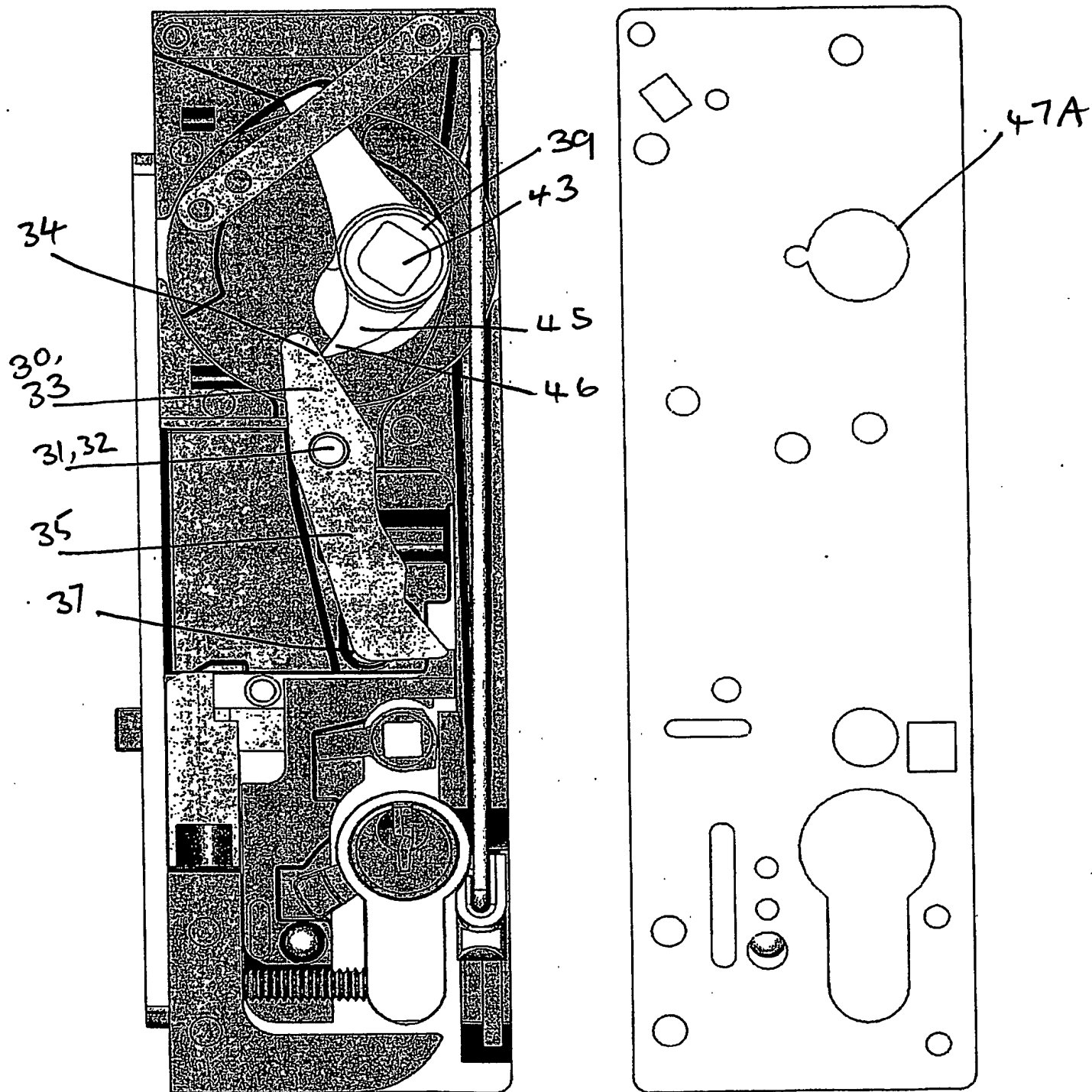


Fig 6

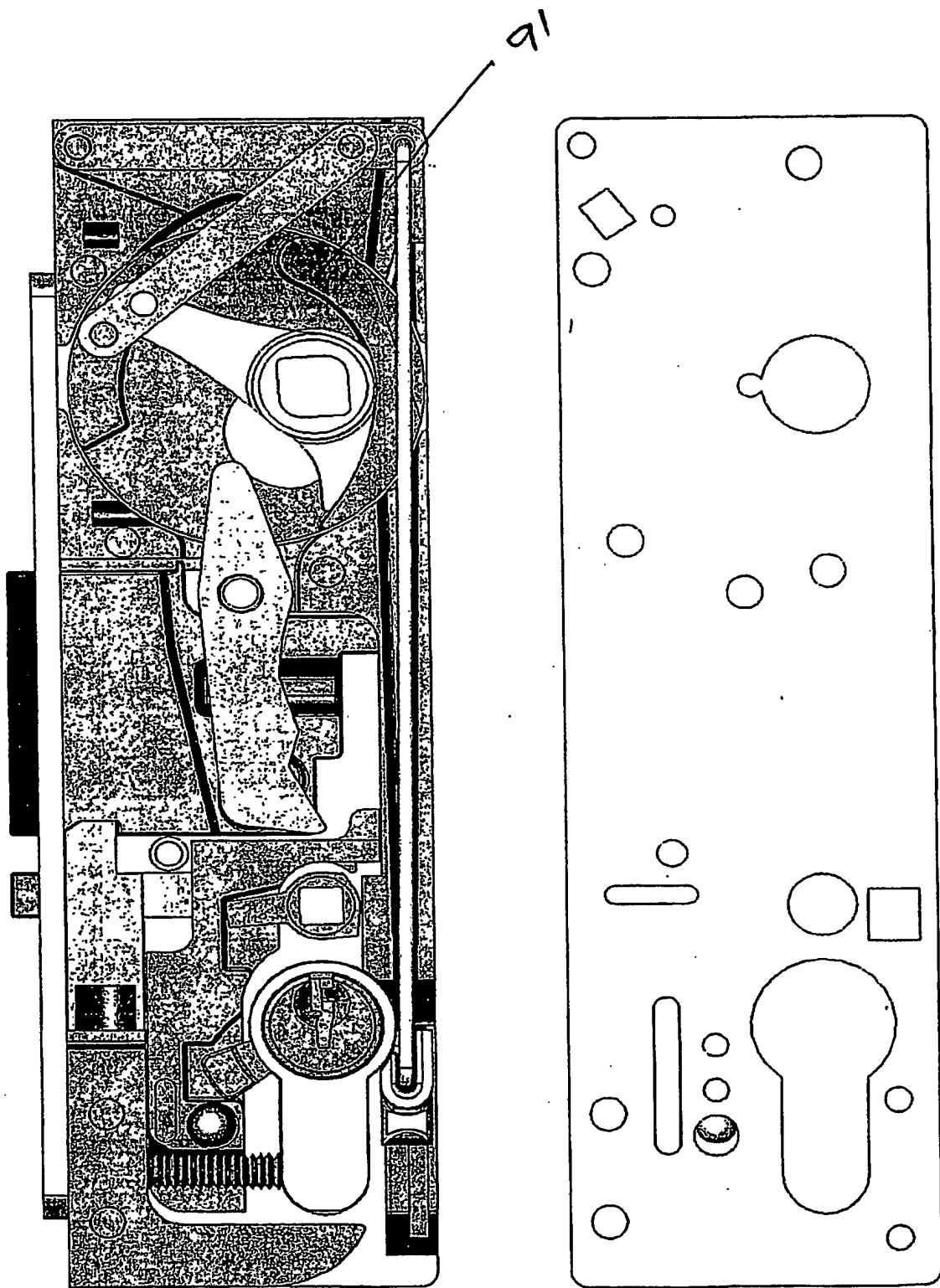


Fig 7

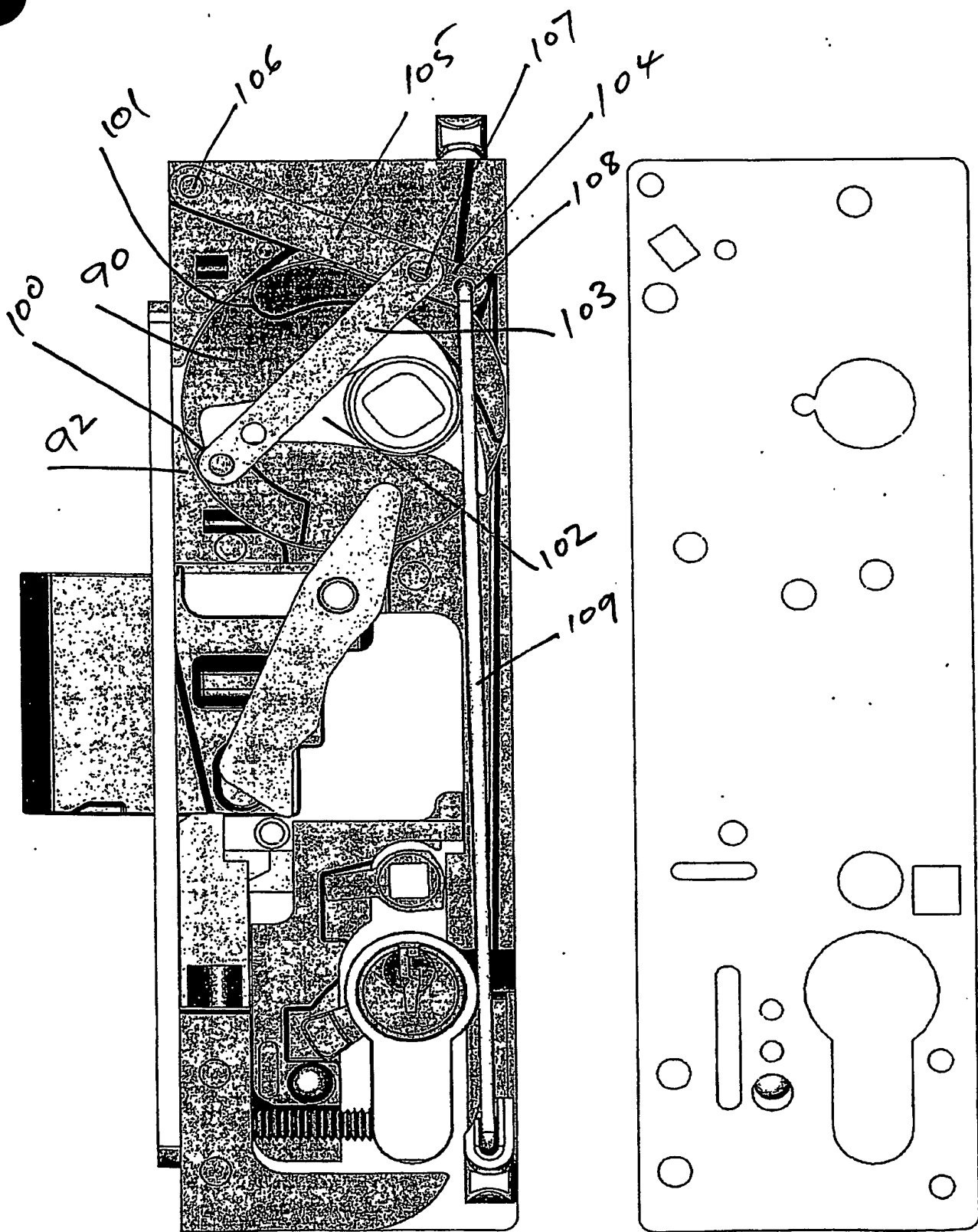


Fig 8

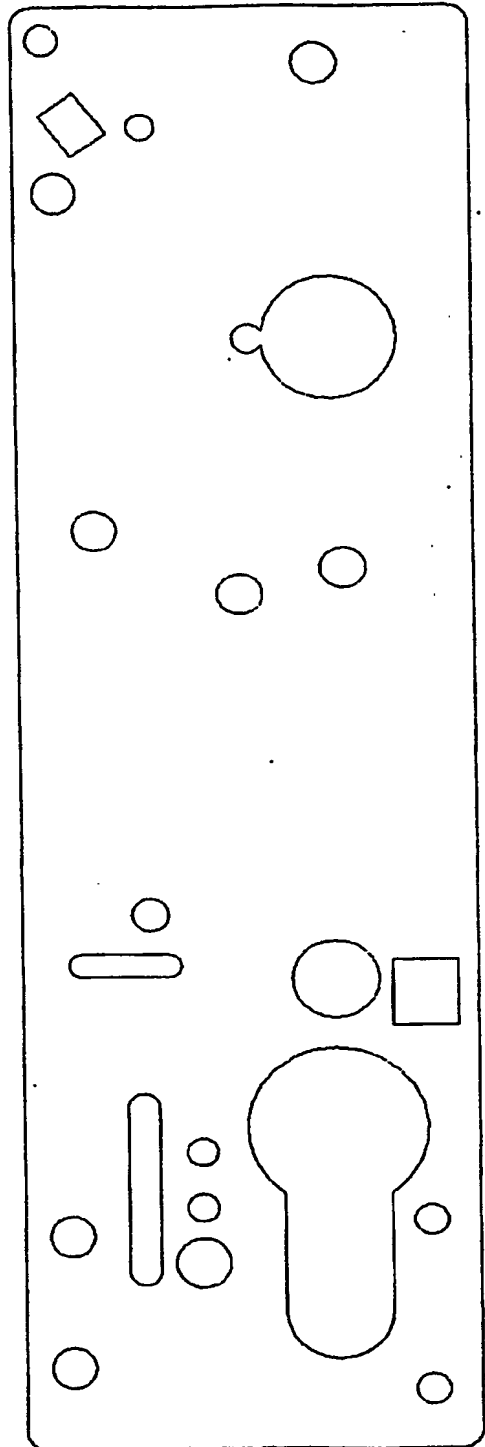
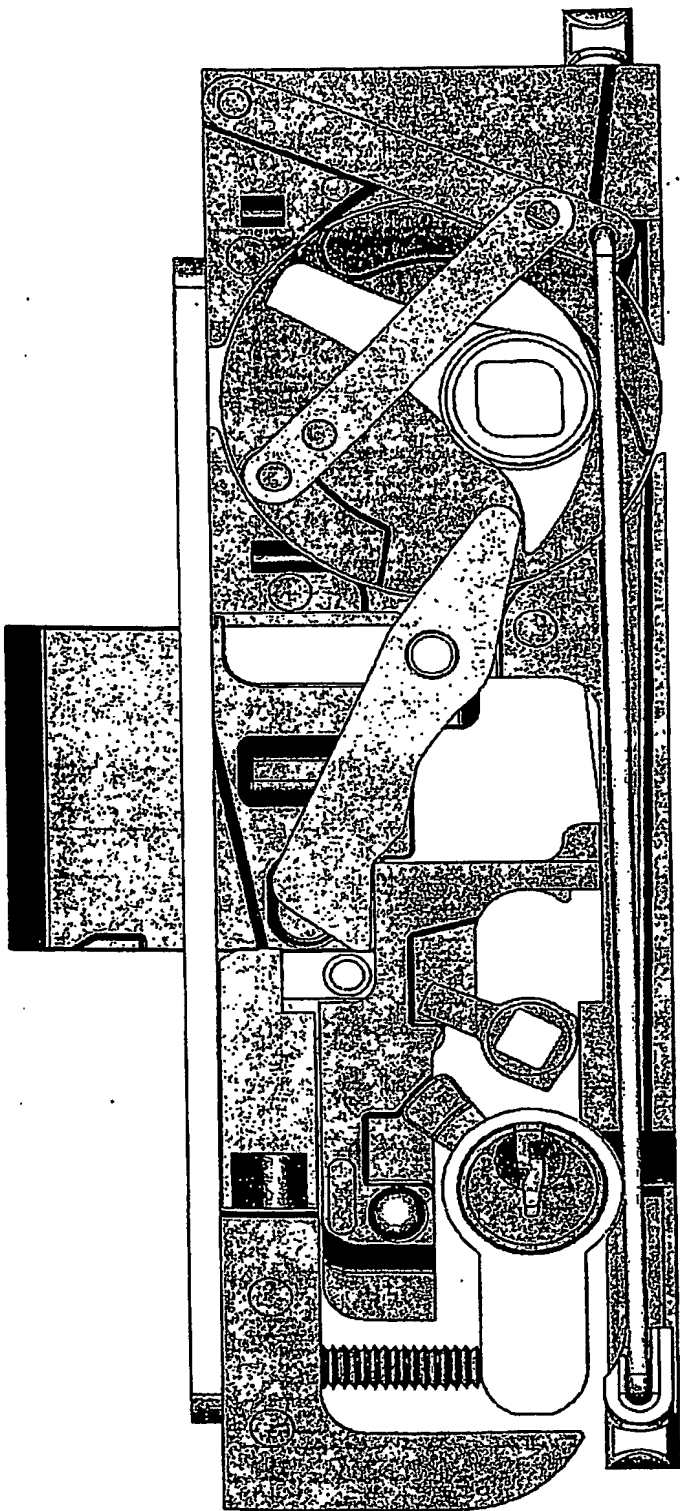


Fig 9

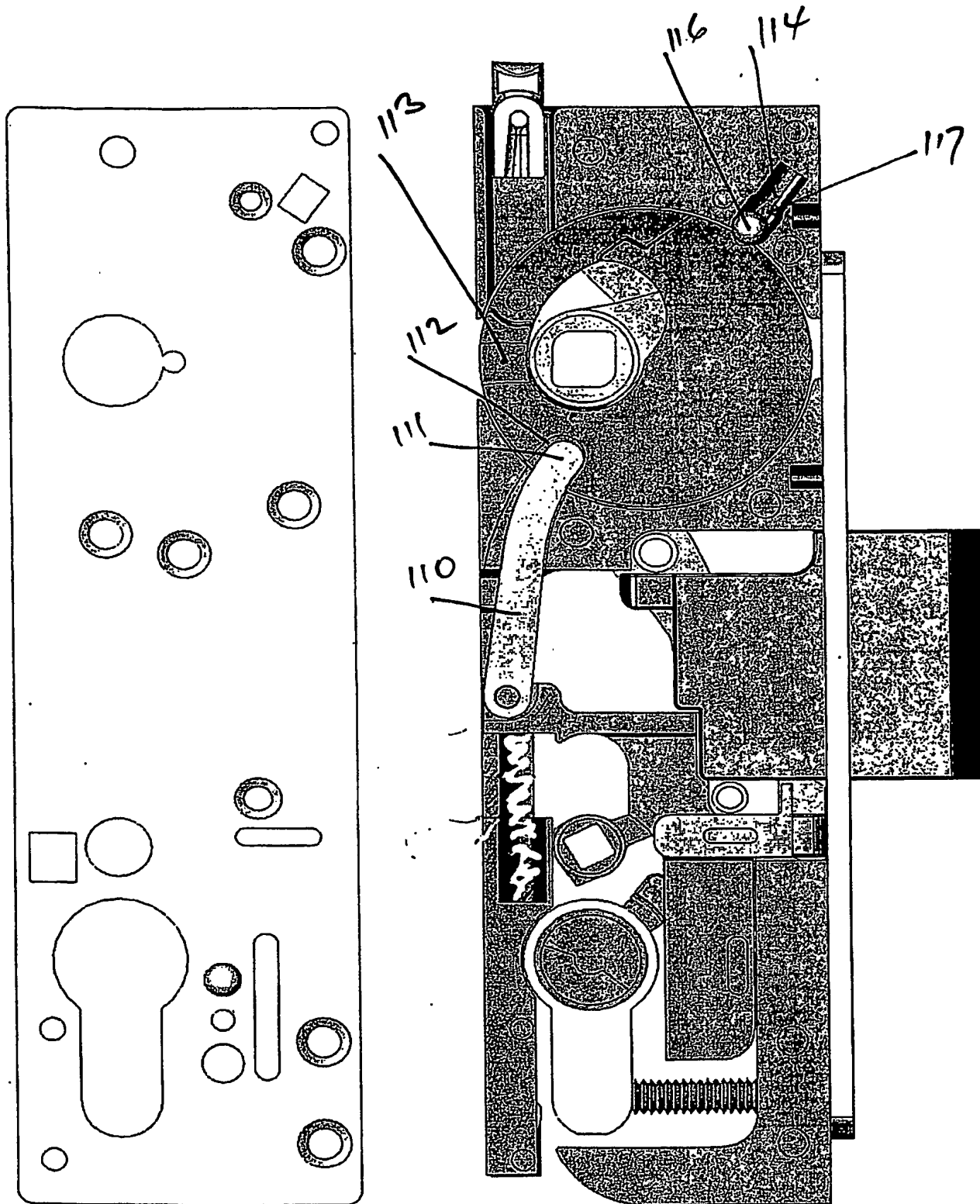


Fig 10

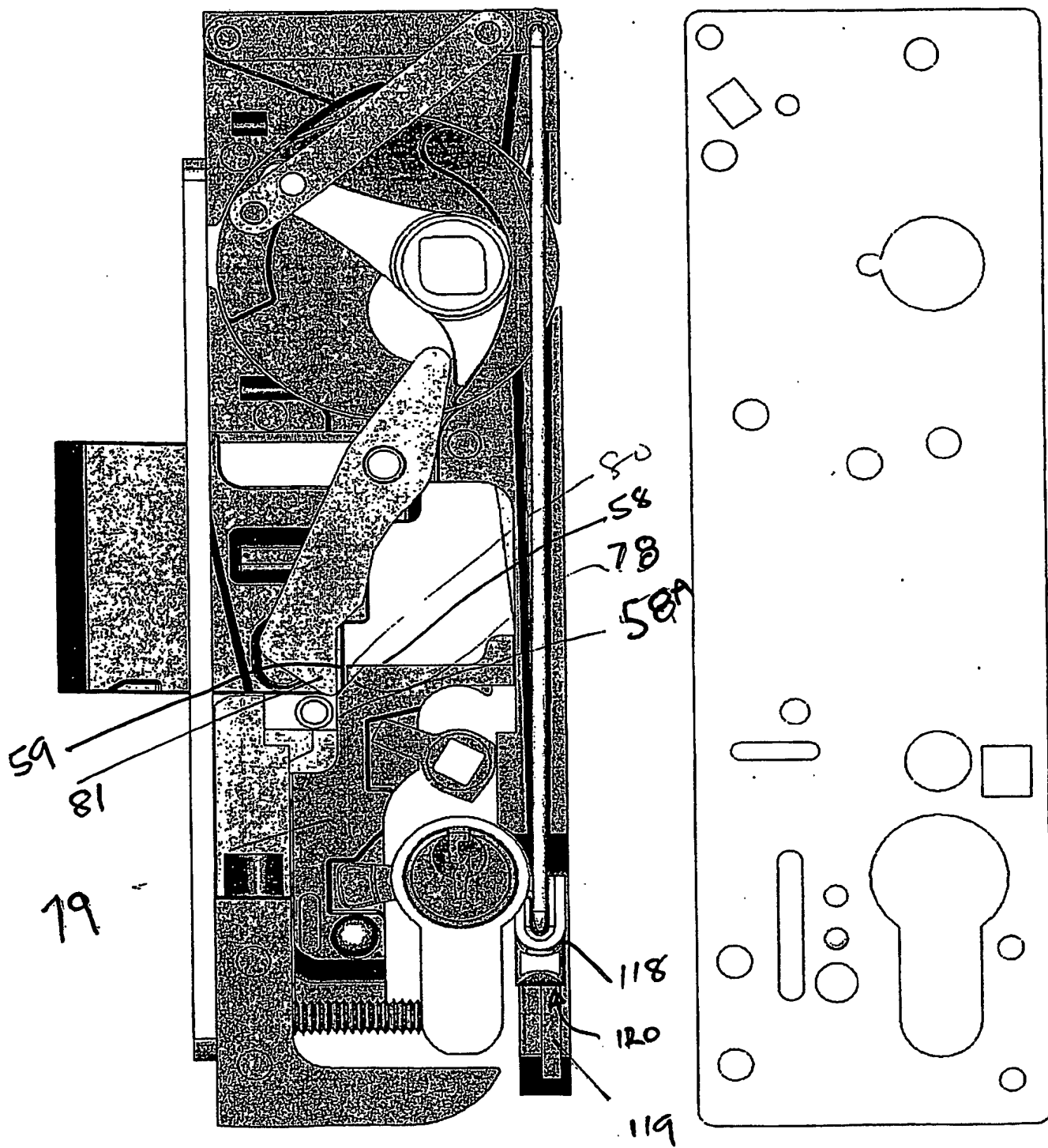


Fig 11

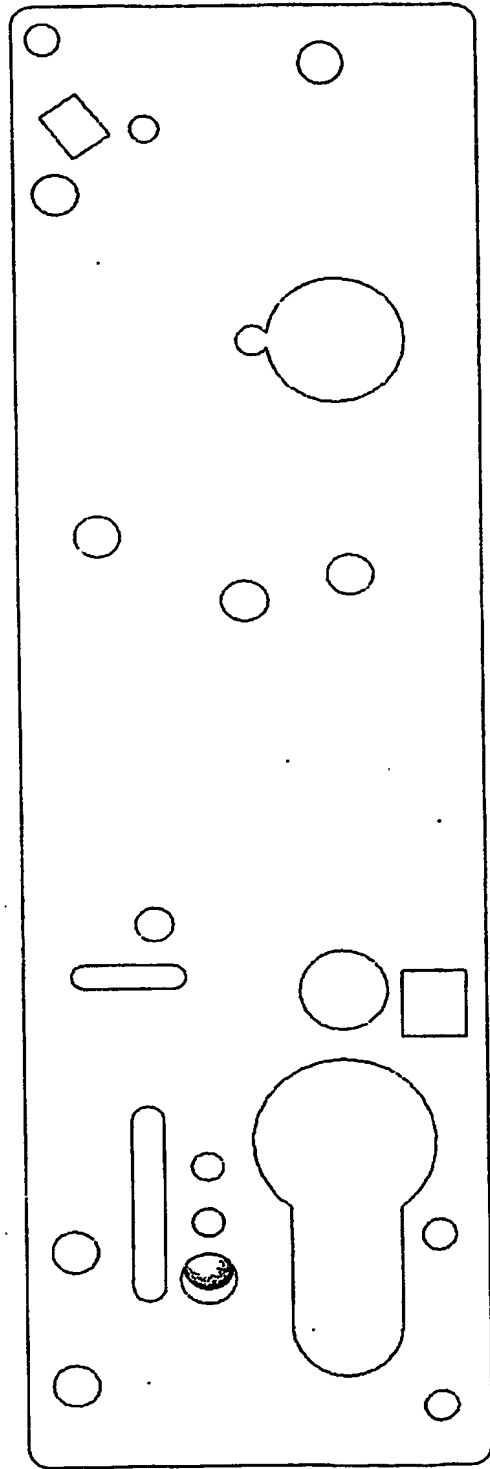
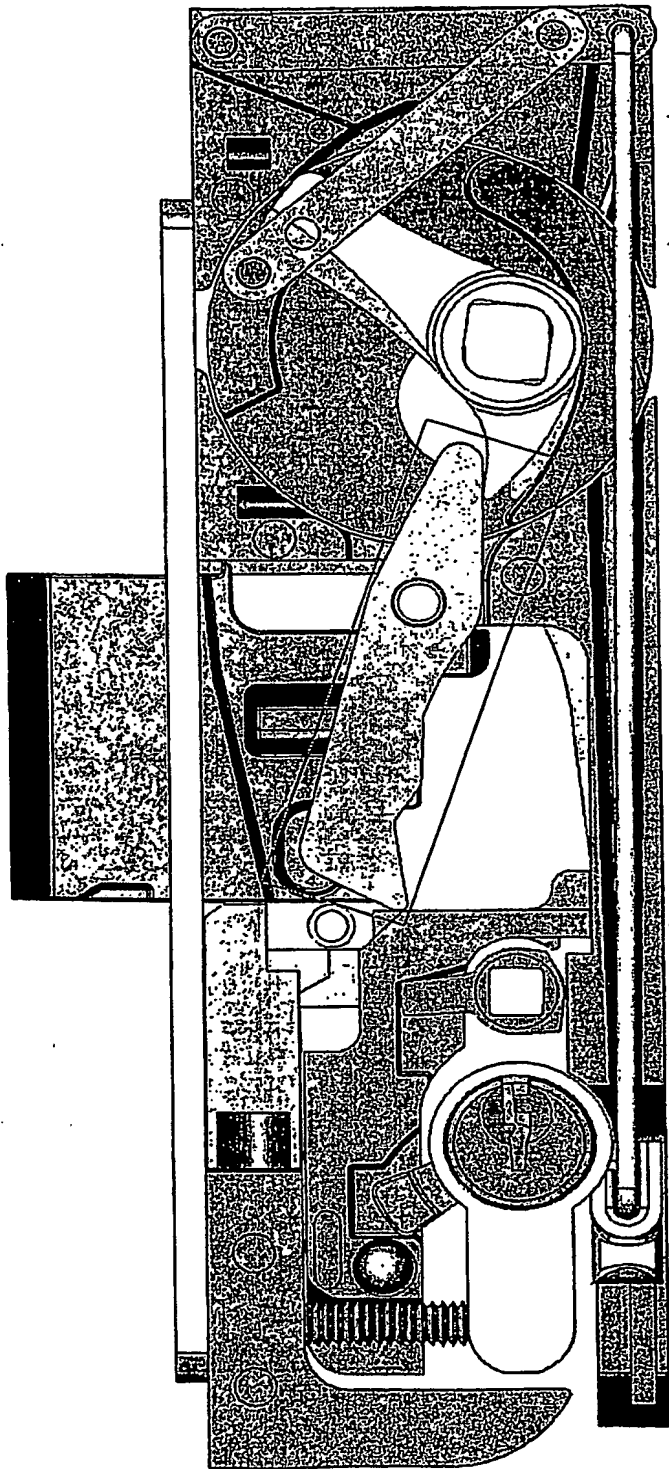
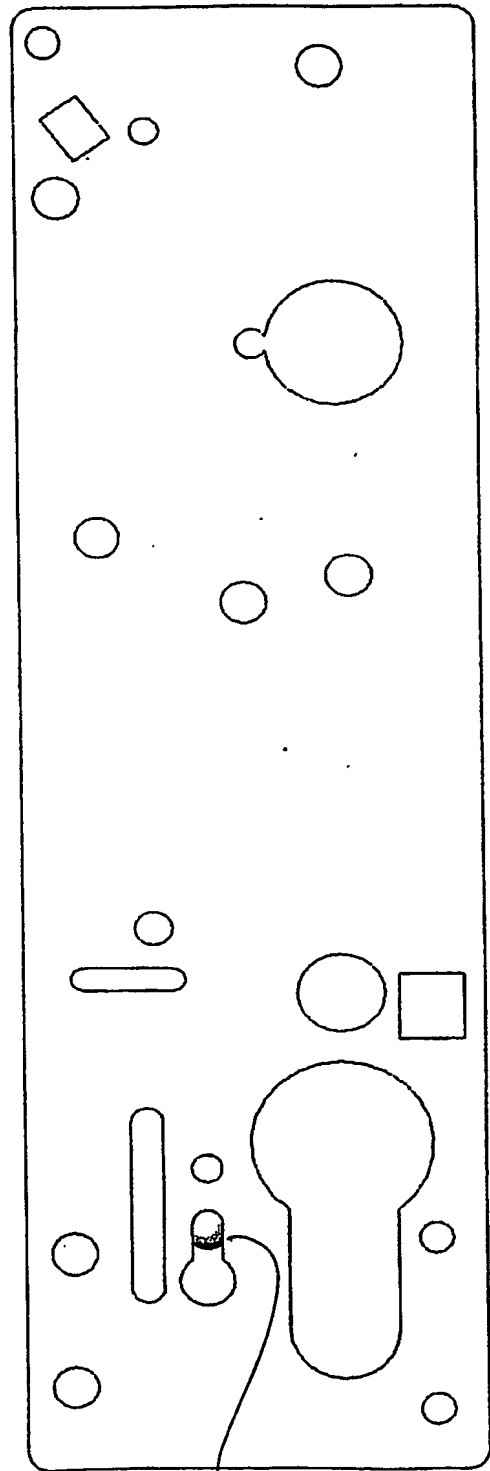
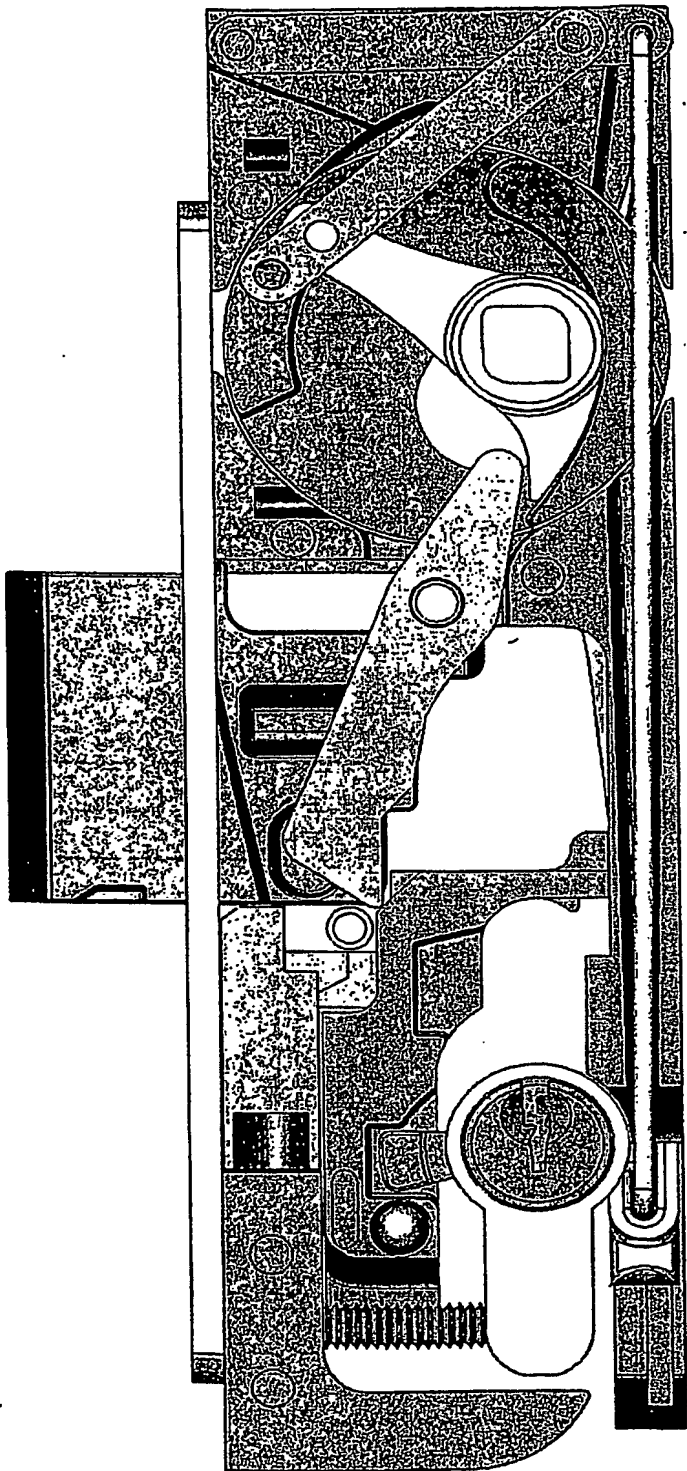


Fig 12



74

Fig 13

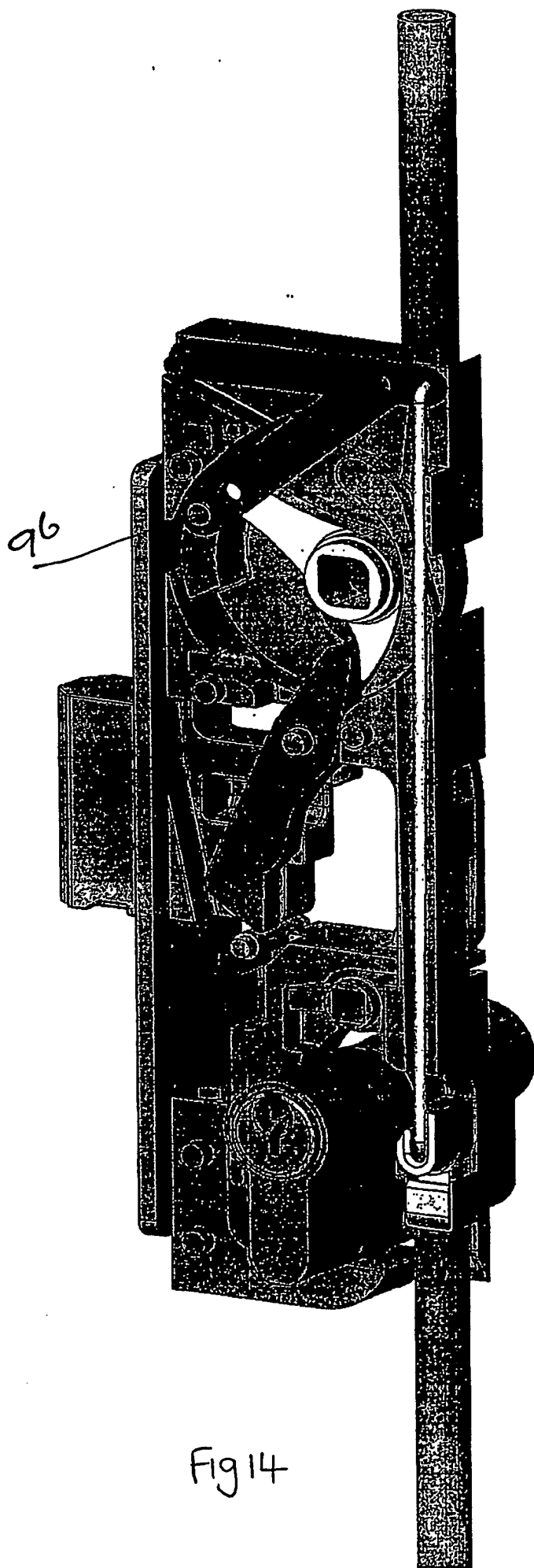


Fig 14

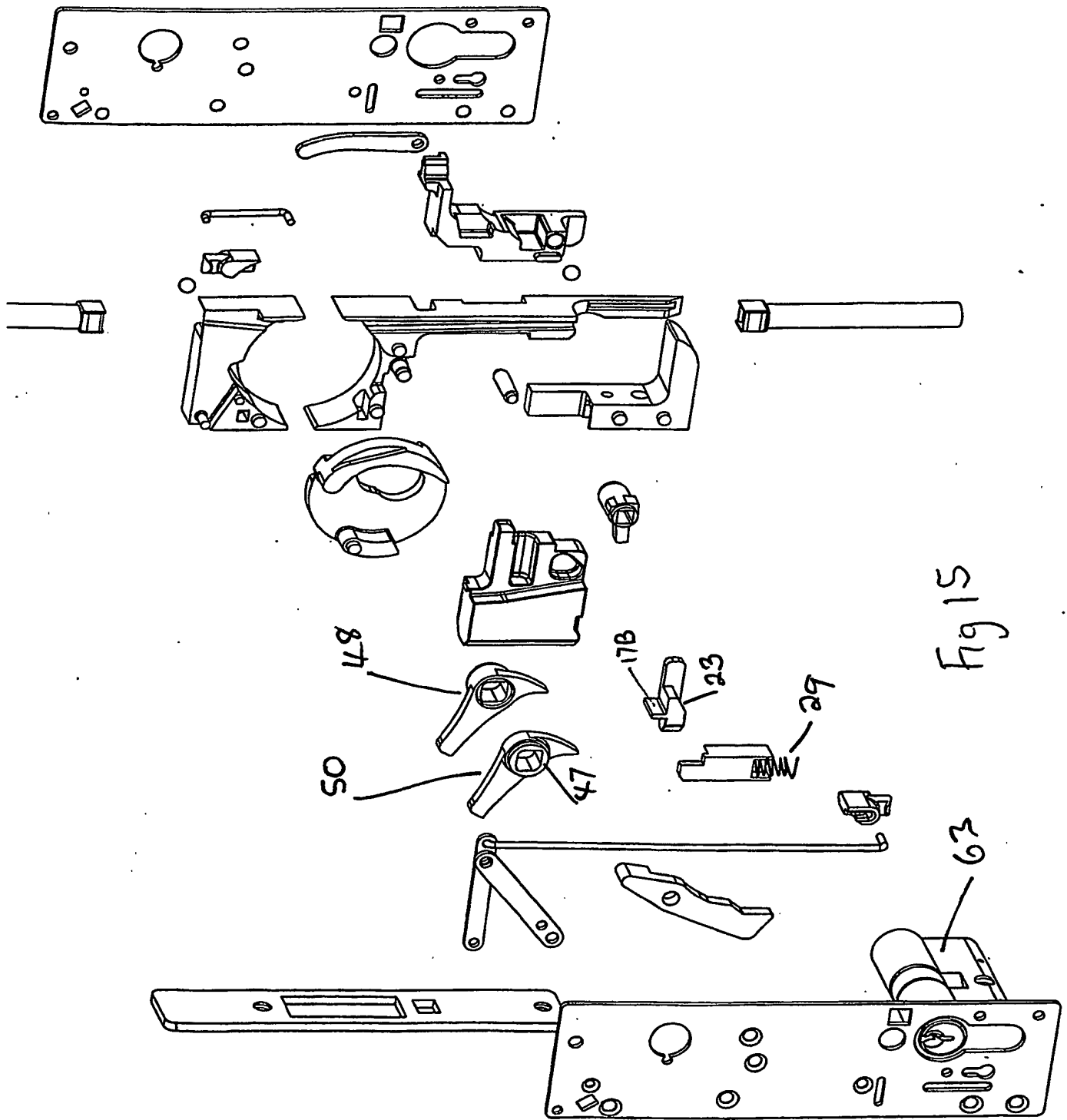


Fig 15

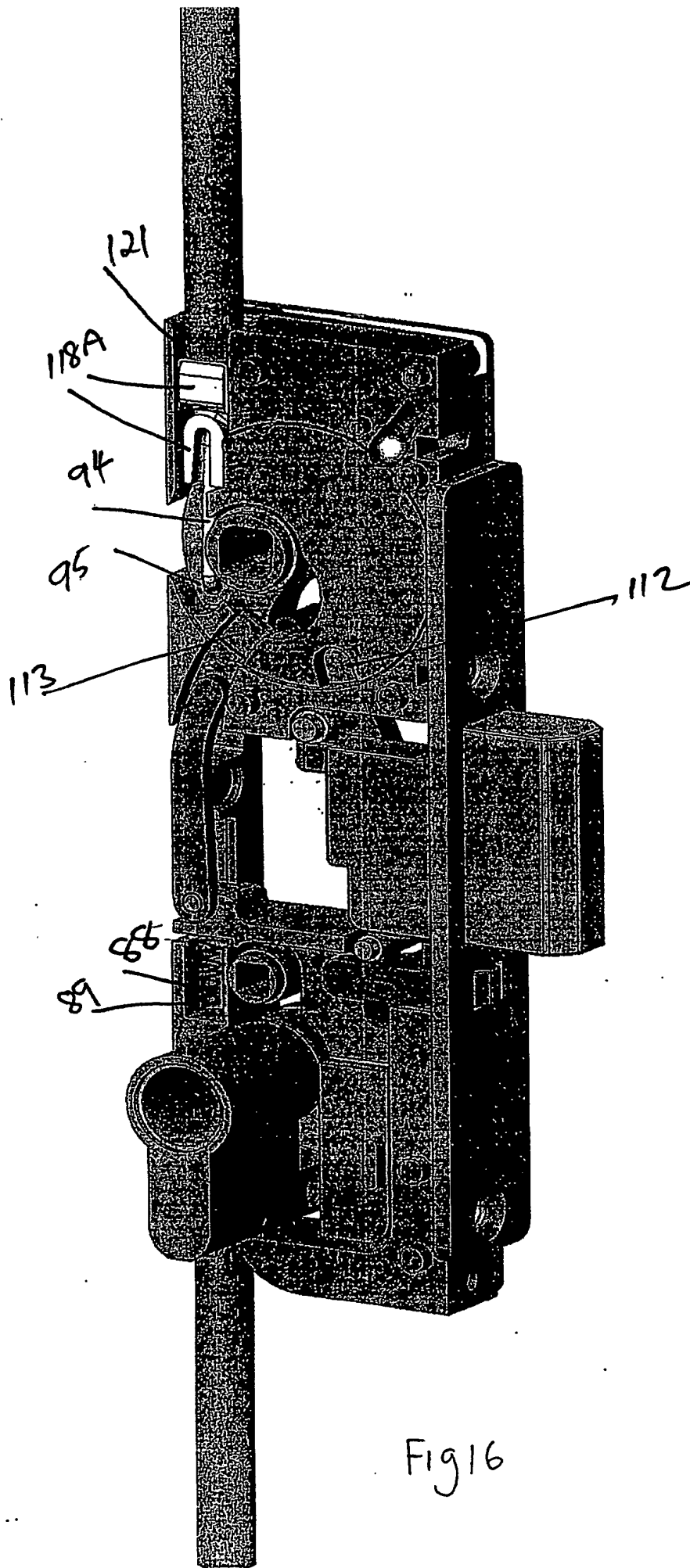


Fig 16

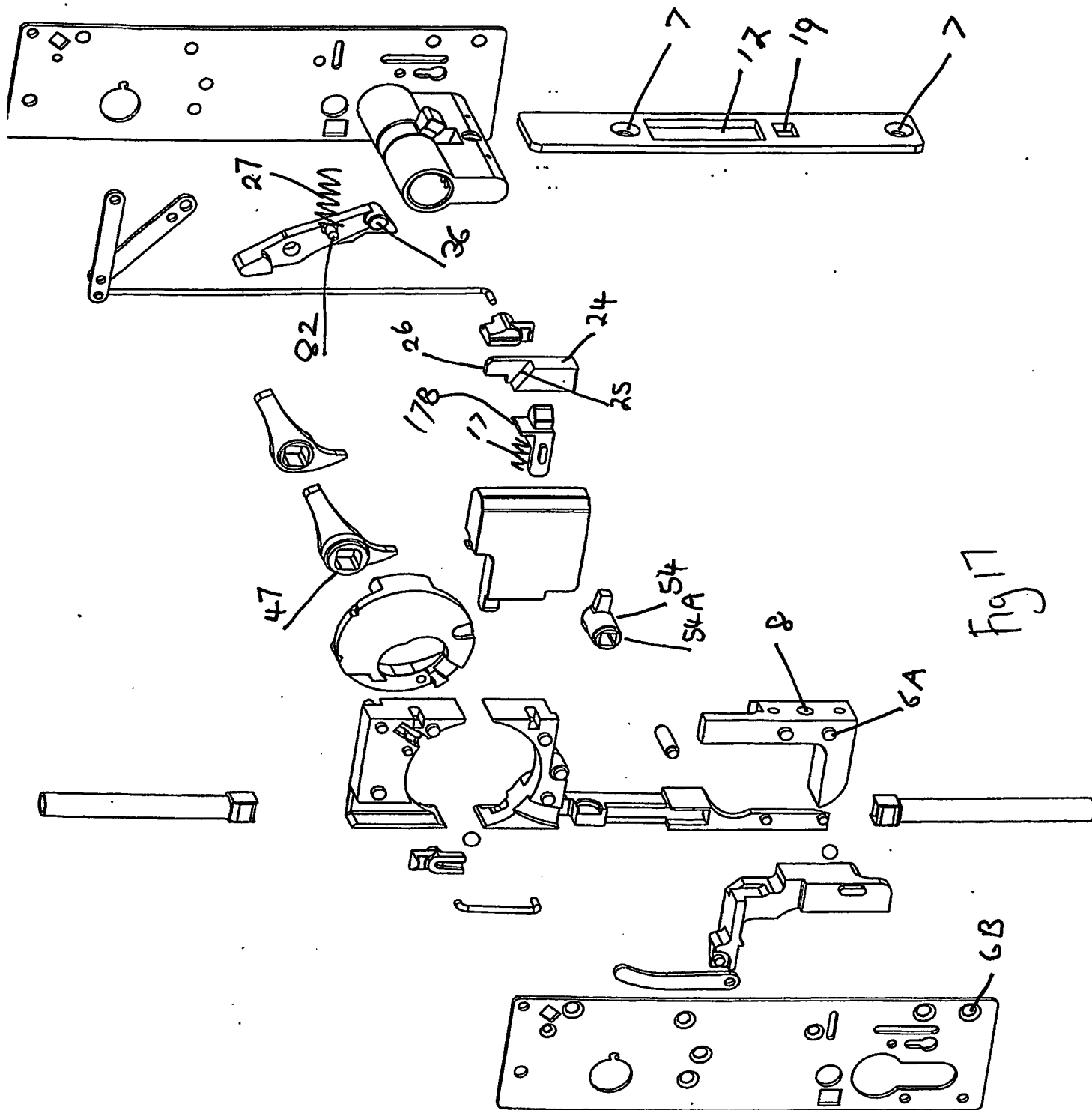


Fig 17

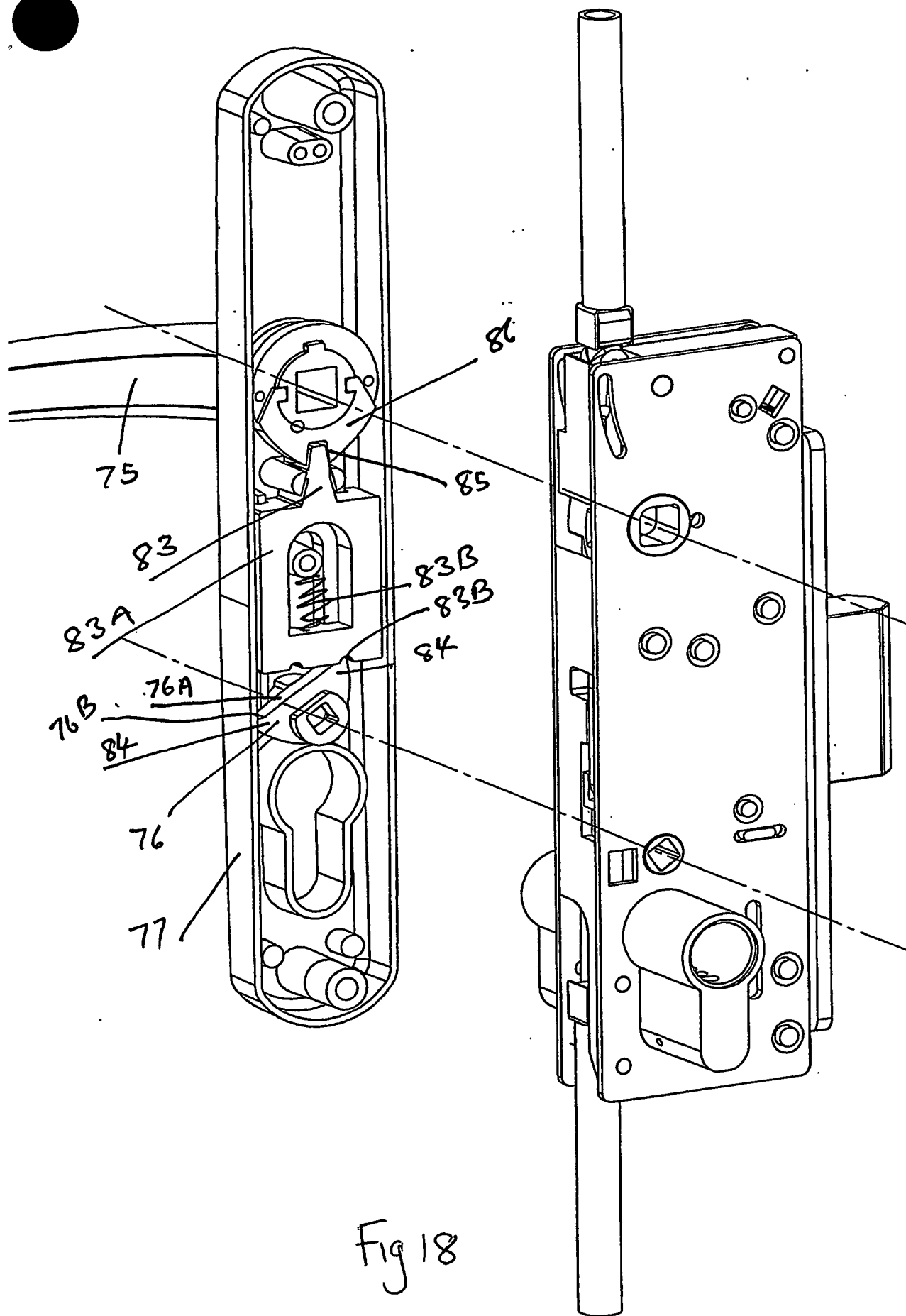


Fig 18

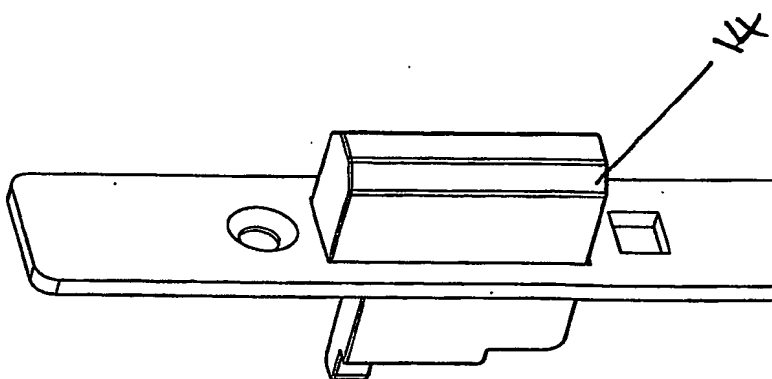
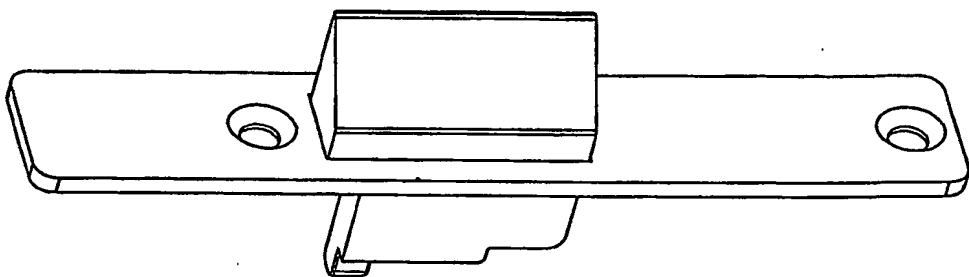
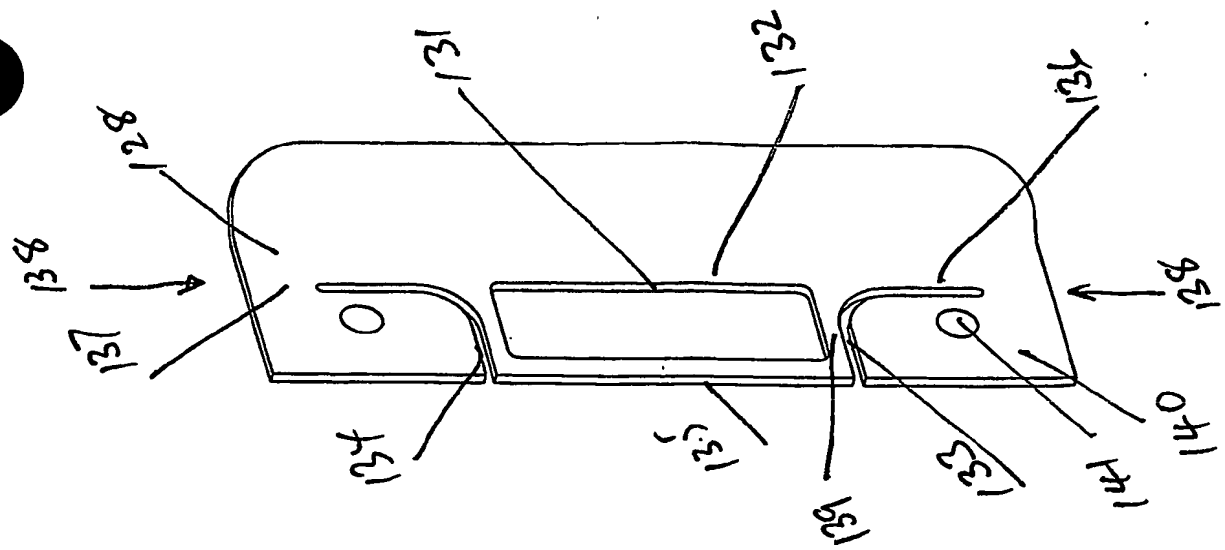


Fig 19

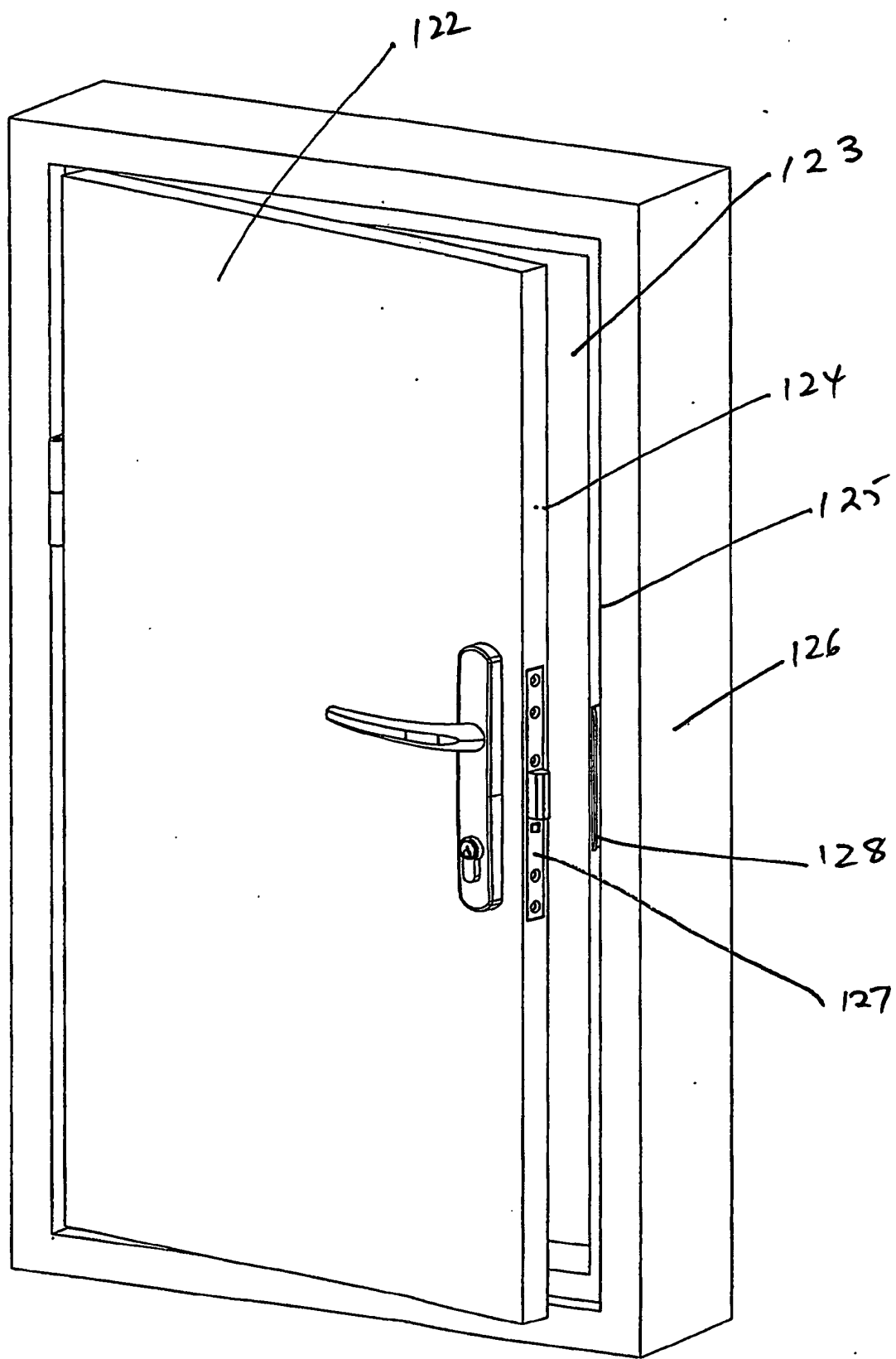


Fig 20

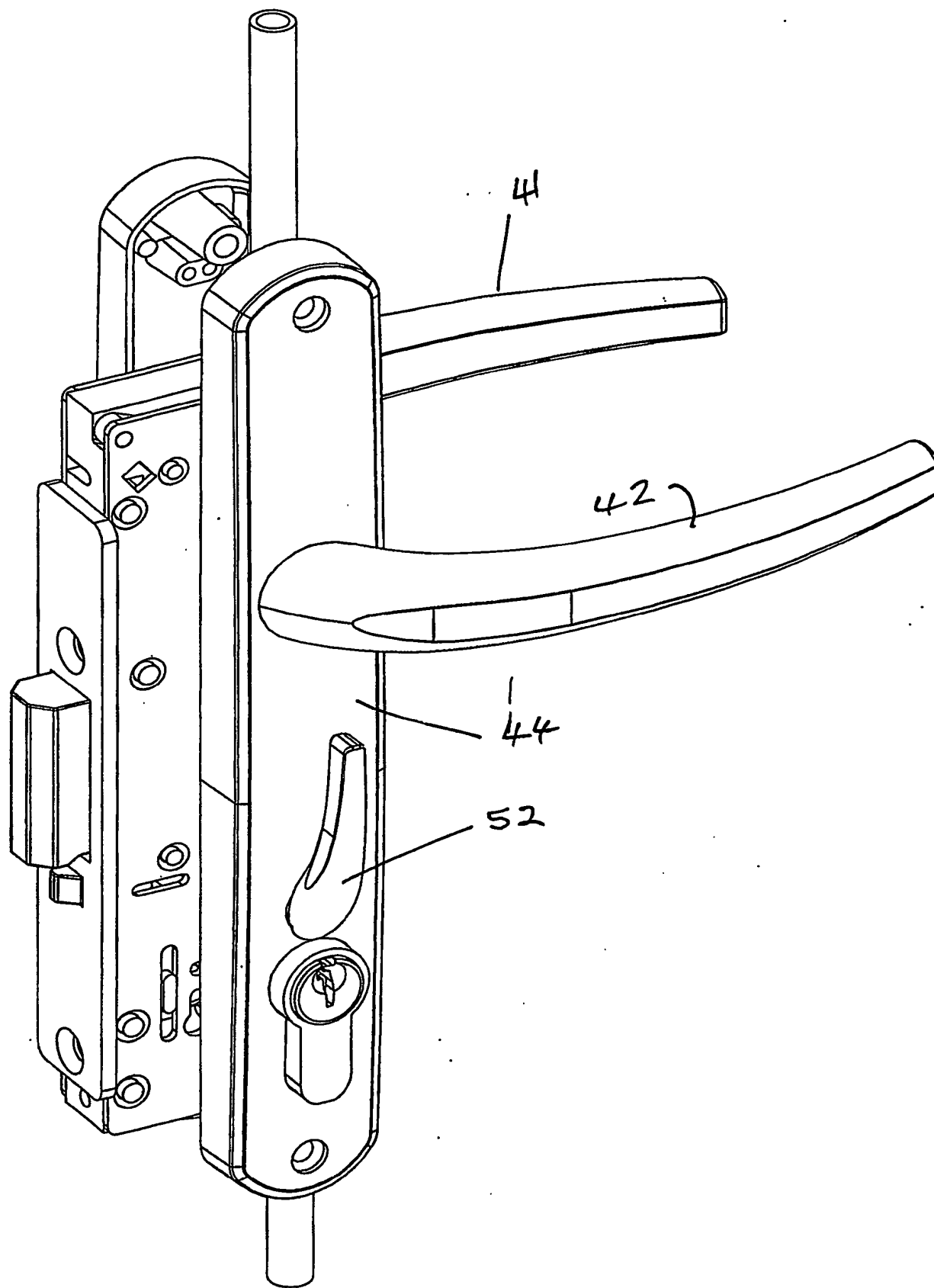
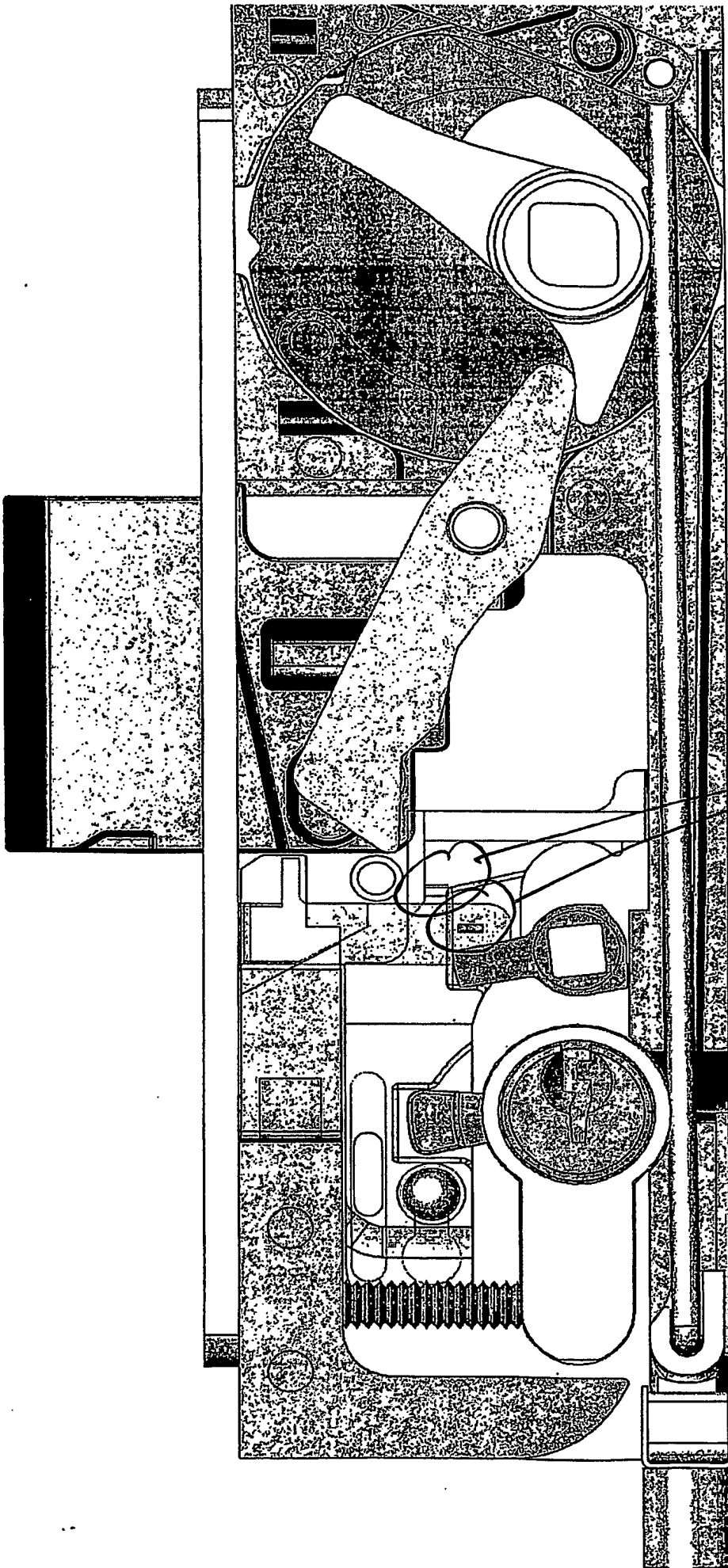
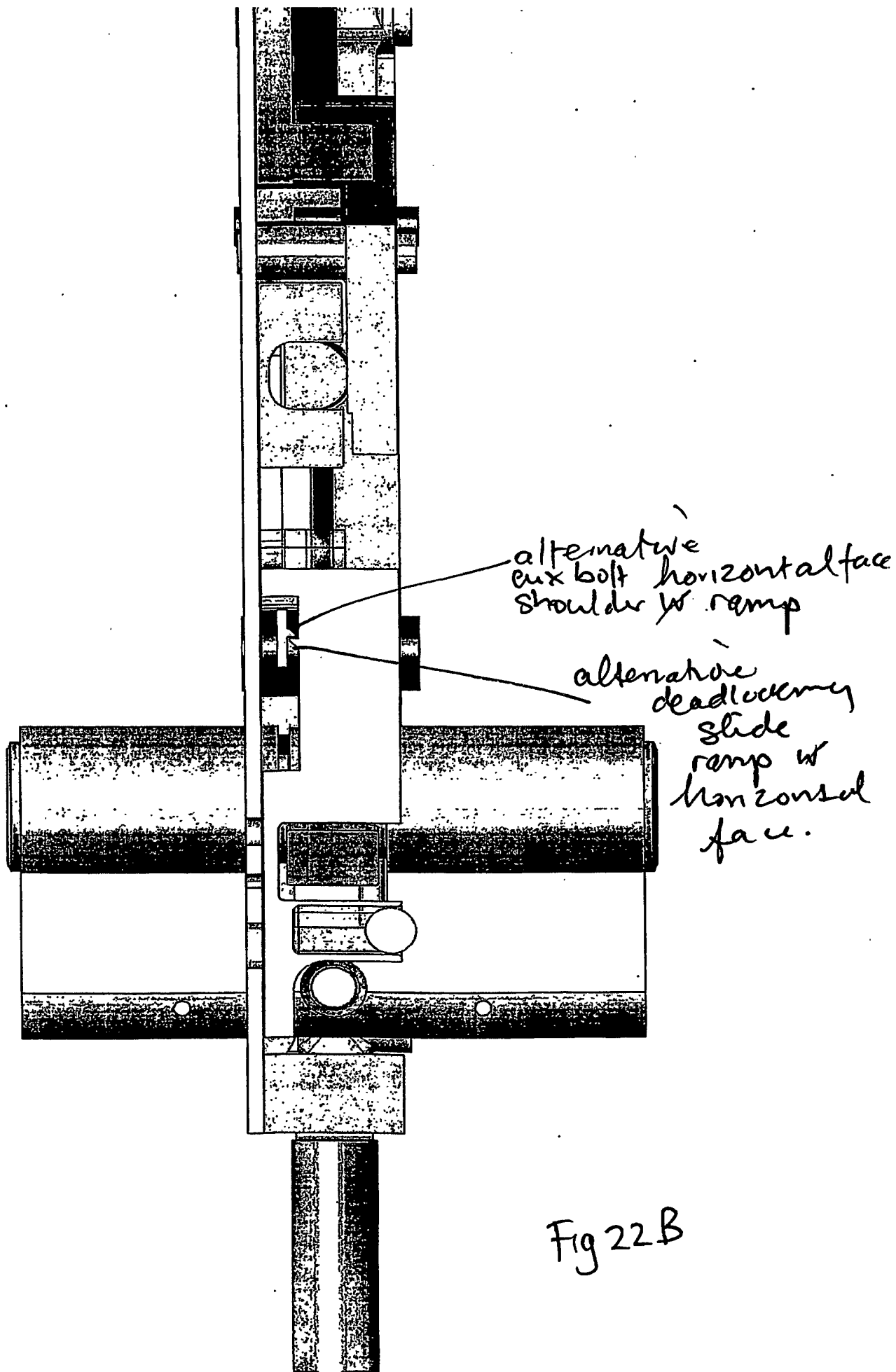


Fig 21



horizontally
displaced

Fig 22A



**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☒ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER: _____**

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.